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SUGAR BULLETIN No. 3.

FIELD EXPERIMENTS WITH SUGAR CANE, III.

BY

C. HOLMAN B. WILLIAMS,
Sugar Cane Agronomist,

C. CAMERON,
Field Manager,

AND

R. R. FOLLETT-SMITH,
Chemist-Ecologist.

THE "DAILY CHRONICLE," GEORGETOWN, DEMERARA,
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[2] Mr. H. G. Seaford acted for Hon. M. B. G. Austin during his absence from the Colony.

[3] Also acted for Mr. J. C. Gibson during his absence from the Colony.

[4] Mr. R. E. Rhodes acted for Hon. G. E. Anderson during his absence from the Colony and has replaced him since his resignation in June.

Note:—The cost of publishing this Bulletin has been met from the funds of the Sugar Experiment Stations' Committee.

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Collaborating in the Execution of the Experiments herein Recorded.

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[1] In connection with the experiments in Berbice.

[2] In connection with the experiments in West Demerara.

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PREFACE.

Sugar Bulletin No. 3 contains the results of one year's work accomplished during the period July 1933 to June 1934. This Bulletin differs slightly in presentation from the previous Bulletins and it is hoped that the present methods of recording results will prove simpler for reference purposes.

In the variety section the results reported lead to the elimination of the majority of the legacy of untested canes which the Department encountered at Sophia in 1929. The results indicate the superiority of the seedlings Diamond 10 and P.O.J. 2878. These varieties have given promising performances on a commercial scale and consequently their extension is recommended, although sufficient experiments have not yet been reaped as second ratoons adequately to determine their merits in this respect. Other canes, more recently bred or imported, *e.g.*, D. 927/22, D. 11/28 and Co. 213, are giving heavy yields, but further experimental data are required before any pronouncement can be made.

It is apparent that the standard cane, D. 625, gives good returns as plant cane and as first ratoons, but the results of the experiments show that it yields an inferior second ratoon crop. Analyses of cane samples from individual plots, a feature of the work of the Station, indicate that D. 625 is of average sweetness and possesses a low juice purity. The glucose ratios of this cane from a large number of experiments, reaped at various ages from 12 to 17 months, indicate that the cane does not ripen satisfactorily under local conditions. Many of the recently tested canes possess more desirable juice characteristics. It has not been possible to carry out any maturity trials *per se*, but the enforced reaping of the experiments at various ages (in order to comply with estate schedules) will permit data on the juice characteristics of the varieties at various ages to be accumulated.

A discussion of the inter-dependence of soil survey work and manurial trials in the field is presented in the second section of the Bulletin. The survey has indicated that there are two main soil types, but there are, undoubtedly, many variations within those types from estate to estate, and even on a single estate, and the work accomplished only serves to emphasize the need for detailed experiments on each estate. The problem is far from simple, being linked with variations in drainage and irrigation facilities, root distribution of the different varieties, etc. The Sugar Experiment Station has already initiated work on root distribution, water table measurements, fluctuations in soil moisture, etc., but much remains to be done and to speed up the solution of the many problems it is suggested that consideration might be given to the allocation of an overseer on each estate to carry on similar and other experimental work in collaboration with the Cane Agronomist.

The nitrogen requirements of plant cane on flooded frontland soil have been fairly well established. Results with ratoon canes suggest that dressings, heavier than usual might be employed with advantage and these latter findings are being further investigated with a view to confirmation. Interesting results have been obtained in trials with sulphate of ammonia on pegasse soils. Sufficient data are not yet available in this connection to counsel any drastic alteration in present practice.

It is a matter of some surprise that, in spite of the marked acidity of the Colony's cane soils, even relatively heavy applications of lime-bearing materials have little effect on the yield. The problem is, however, still under investigation.

Other field experiments, already established or in the process of initiation, concern the use of phosphatic manures, the value of cyanamide and certain aspects of flood-fallowing.

The greater part of the expenditure connected with the work here reported is borne by the sugar producers of the Colony. Additional grants of financial assistance have been made by the Empire Marketing Board, the Colonial Development Fund, Messrs. Booker Bros. McConnell & Co., Ltd. and the Imperial Chemical Industries, Ltd.

In this connection the initiative undertaken by Messrs. Booker Bros. McConnell & Co., Ltd., is most gratifying, not only for this contribution, but for providing funds for a detailed soil survey of their lands, a major pre-requisite for launching a series of manurial experiments.

Sugar Bulletin 3 deals with matters of considerable importance to all those interested in the Colony's premier industry. For obvious reasons no drastic changes in field practice can be definitely recommended until a greater number of experiments have gone through a complete cycle of three crops (at present only the first few trials started the year the work was reorganised have reached that stage), but the questions Planters have been asking themselves and asking this Department for years are being closely investigated by a comprehensive series of very carefully executed experiments, and the indications are that in the near future the Department will be justified in advising modifications in estate practice which will materially affect yields and costs.

F. BURNETT,
Acting Director of Agriculture.

FIELD EXPERIMENTS WITH SUGAR CANE, III.

BY

C. HOLMAN B. WILLIAMS, *Sugar Cane Agronomist*, C. CAMERON, *Field Manager*, AND R. R. FOLLETT-SMITH, *Chemist-Ecologist.*

INTRODUCTION.

This Bulletin, the third of the series, describes the results obtained from field experiments with sugar cane reaped during the year ending June 30, 1934. The Bulletin is divided into 3 sections :—

Variety Trials	...	dealing with 35 experiments,
Manurial Trials	...	dealing with 16 experiments,
Under-drainage Trials...		dealing with 2 experiments.

The methods adopted in the execution of these trials are similar to those described in the introduction to *Sugar Bulletin* No. I.

VARIETY TRIALS.

The method of presentation of the results of the variety trials differs somewhat from that adopted in previous Bulletins. The section has been divided into four sub-sections :—(a) plant cane trials, (b) first ratoon trials, (c) second ratoon trials and (d) discussion and summary of the results of variety trials. In subsection (d) the various characteristics of the different varieties, *i.e.*, the tonnage, the sucrose content, the juice purity and the glucose ratio, have, in each trial, been compared with the standard cane, D. 625, taken as 100.0. This innovation makes for easy comparison of the different varieties.

SUB-SECTION A.—PLANT CANE VARIETY TRIALS.

Details of the plant cane variety trials reaped at Sophia Experiment Station during the period under review appear in Table I.

TABLE I.

PLANT CANE VARIETY TRIALS REAPED AT SOPHIA EXPERIMENT STATION.

Field.	Age of Canes, Months.	Date of Planting.	Date of Reaping.	Number of Varieties.	Number of Replicates.	Type of Layout.
1 West	15.50	23.V.32	7.IX.33	4	8	Randomised Block.
2 „	14.00	18.VII.32	20.IX.33	7	9	Randomised Block.
3 „	15.00	17.VIII.32	18.XI.33	7	9	Randomised Block.
10 „	14.00	27.VII.32	22.IX.33	7	10	Randomised Block.
11 „	15.75	18.XI.32	12.III.34	7	10	Randomised Block.
14 „	15.50	6.VIII.32	20 XI.33	6	6	Latin Square.
15 „	15.50	9.VIII.32	22.XI.33	7	7	Latin Square.
16 „	13.50	27.I.33	13.III.34	9	7	Randomised Block.
1 East	17.00	5.IV.32	5.IX.33	8	8	Latin Square.

The monthly rainfall recorded at Sophia during the progress of the experiments, together with the mean monthly rainfall experienced at the Station during preceding years, will be found in Appendix I where the variation from the normal rainfall is also indicated for each experiment.

Composite samples of topsoil and subsoil were collected from each experimental site. The results of their laboratory examination appear in Appendix II.

The results of the trial in Field 1 West, Sophia, are presented in Table II and are also shown graphically in Figure I.

TABLE II.

Location : SOPHIA 1 West,
Age of Canes : PLANTS, 15.50 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields :	D. 53/27	39.95	12.33	6.54	86.4	4.92	110.81
	D. 625	39.87	11.88	11.32	82.9	4.76	107.21
	D. 880/21	38.91	11.51	14.76	83.3	4.49	101.13
	D. 516/20	35.28	10.16	19.10	77.3	3.60	81.08
	Mean :					4.44	100.00
	Standard Error :					0.26	5.86
	Significant Difference, 20 : 1 :					0.80	18.02

Varieties D. 53/27 and D. 880/21, the latter undergoing its first field trial, give yields similar to D. 625. Variety D. 516/20, also making its first appearance

in an experiment, gives a definitely lower yield than the other three canes. This cane was obviously not mature at reaping. D. 53/27, as usual, shows in the plant canes a slight improvement over the standard, as far as sucrose content and juice purity are concerned. Its failure, in many cases, to ratoon has caused it to be regarded with some suspicion.

Field 1 W. received on the whole rather less than the normal amount of rain. For the month following planting the rainfall was adequate, but during the next five months a fairly dry spell was experienced. For the remaining nine months the rain was normally distributed.

The topsoil of Field 1 W. is a markedly acidic clay overlying a slightly acidic clay subsoil. The organic matter content of the topsoil is low and the carbon : nitrogen ratio is narrow. The salinity of the topsoil is low, that of the subsoil is much lower than the average. The theoretical lime requirements are normal.

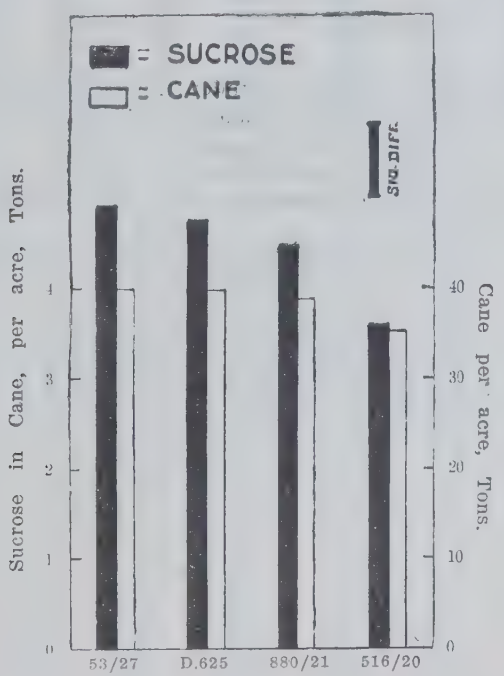

FIG. I.

Yields of Sucrose and Cane, per acre, from Field 1W., Sophia (Plant Canes).

The results of the plant cane trial in Field 2 West, Sophia, are recorded in Table III and are graphically presented in Figure II.

TABLE III.

Location : SOPHIA, 2 West.
Age of Canes : PLANTS, 14.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields :	Co. 213	39.85	12.05	7.35	83.1	4.79	122.51
	Co. 281	33.12	13.41	3.73	87.1	4.45	113.81
	Co. 210	40.15	10.92	7.44	81.2	4.40	112.53
	P.O.J. 253	34.37	12.15	6.30	84.8	4.16	106.39
	D. 625	36.79	10.05	12.73	75.4	3.73	95.40
	D. 73/17	31.19	10.02	9.82	78.5	3.12	79.80
	D. 76/02	25.45	10.68	8.60	80.6	2.69	68.80
	Mean :					3.91	100.00
	Standard Error :					0.22	5.63
	Significant Difference, 20 : 1 :					0.67	17.14

The six varieties in this trial are undergoing their first field comparison with the standard variety. The Indian canes Co. 213, Co. 281 and Co. 210 have given very promising results and have all produced heavier yields than D. 625. P.O.J. 253 has not definitely outyielded the standard cane. It is unlikely that the two other varieties, D. 73/17 and D.76/02, will receive much further attention.

Field 2 W. experienced a fairly dry spell during the first four months of growth. During the remaining ten months the rainfall was normally distributed.

The topsoil of Field 2 W. is a markedly acidic clay overlying a slightly acidic heavy clay subsoil. The organic matter content of the topsoil is low and the carbon : nitrogen ratio is narrow. The salinity of both topsoil and subsoil is below the normal. The theoretical lime requirement of the topsoil is normal, that of the subsoil is above the average.

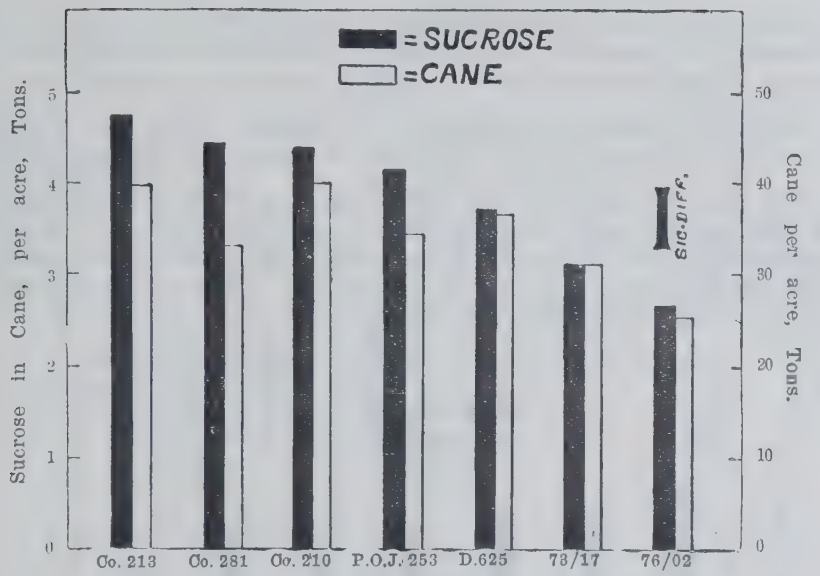

FIG. II.

Yields of Sucrose and Cane, per acre, from Field 2W., Sophia (Plant Canes).

The results of the plant cane trial in Field 3 West, Sophia, are presented in Table IV and are shown graphically in Figure III.

TABLE IV.

Location : SOPHIA, 3 West.

Age of Canes : PLANTS. 15.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields :	D. 895/22	45.69	12.29	6.69	85.7	5.61	107.47
	D. 11/24	46.10	11.92	9.99	84.3	5.47	104.79
	D. 625	45.16	12.02	14.14	82.0	5.41	103.64
	D. 548/21	47.56	11.14	13.42	83.4	5 29	101.34
	D. 50/28	50.05	10.12	18.80	75.8	5.10	97.70
	D. 682/20	38.99	12.98	7.55	86.3	5.05	96.74
	D. 8/28	38.81	12.04	10.63	83.6	4.64	88.89
	Mean :					5.22	100.00
	Standard Error :					—	—
	Significant Difference, 20 : 1 :					—	—

None of the canes in this experiment gave yields which definitely differed from that of the standard. D. 11/24 deserves further trial, but D. 8/28 is not likely to be included in new trials. D. 682/20 appears to be a sweet cane.

Field 3 W. experienced a fairly dry spell during the first four months of growth. During the remainder of the period the rainfall was normally distributed.

The topsoil of Field 3 W. is a markedly acidic clay overlying a similar subsoil. The organic matter contents of both topsoil and subsoil are low and the carbon : nitrogen ratios are narrow. The salinities of both topsoil and subsoil are normal for this class of soil. The theoretical lime requirement of the topsoil is above the average, that of the subsoil is normal.

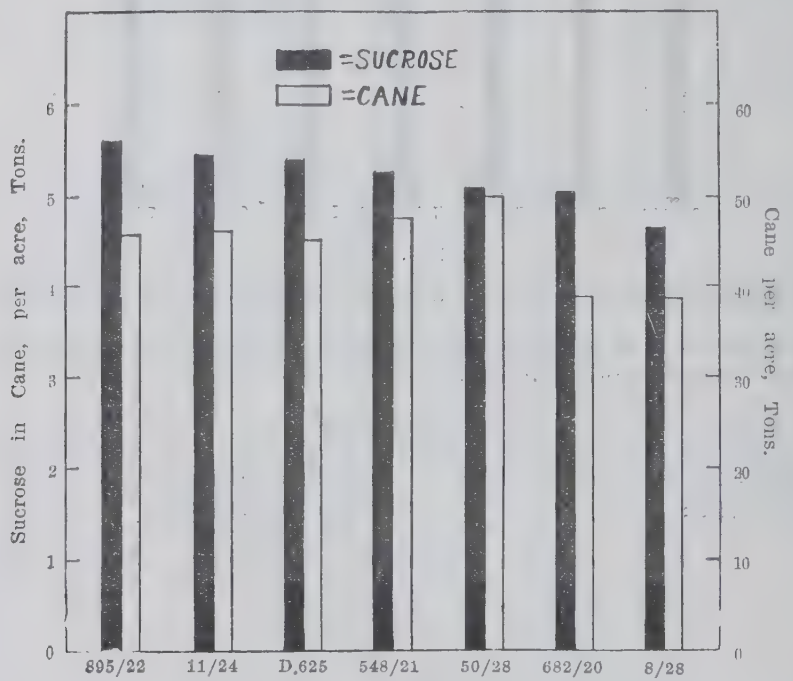

FIG. III.

Yields of Sucrose and Cane, per acre, from Field 3W., Sophia (Plant Canes).

The results of the plant cane trial in Field 10 West, Sophia, are recorded in Table V and are shown graphically in Figure IV.

TABLE V.

Location : SOPHIA, 10 West.
Age of Canes : PLANTS, 14.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields :	D. 11/28	39.43	12.41	6.55	86.2	4.89	124.74
	D. 625	32.73	12.77	8.77	84.0	4.18	106.63
	D. 13/28	30.71	13.08	7.11	84.4	4.03	102.81
	D. 204/20	30.89	12.21	7.16	84.1	3.76	95.92
	D. 15/28	27.52	13.44	5.74	87.8	3.69	94.13
	D. 3/28	30.48	11.48	7.51	84.1	3.47	88.52
	D. 24/28	27.56	12.43	5.73	86.9	3.42	87.24
	Mean :					3.92	100.00
	Standard Error :					0.20	5.10
	Significant Difference, 20 : 1 :					0.58	14.80

This trial contains five 1928 seedlings which are being compared for the first time with the standard cane. D. 11/28 definitely outyields D. 625. This cane has distinguished itself in other trials recorded in this Bulletin. D. 204/20 continues to give good plant cane yields. It is, however, a comparatively poor ratooner. Seedlings D. 3/28 and D. 24/28 are not likely to receive much further attention.

Field 10 W. experienced a fairly dry spell during the first four months of growth. During the remaining ten months the rainfall was normally distributed.

The topsoil of Field 10 W. is a markedly acidic clay overlying a slightly acidic clay subsoil. The organic matter content of the topsoil is low. The carbon : nitrogen ratios are normal. The salinity of the topsoil is normal, that of the subsoil is below the average. The theoretical lime requirements are below the average.

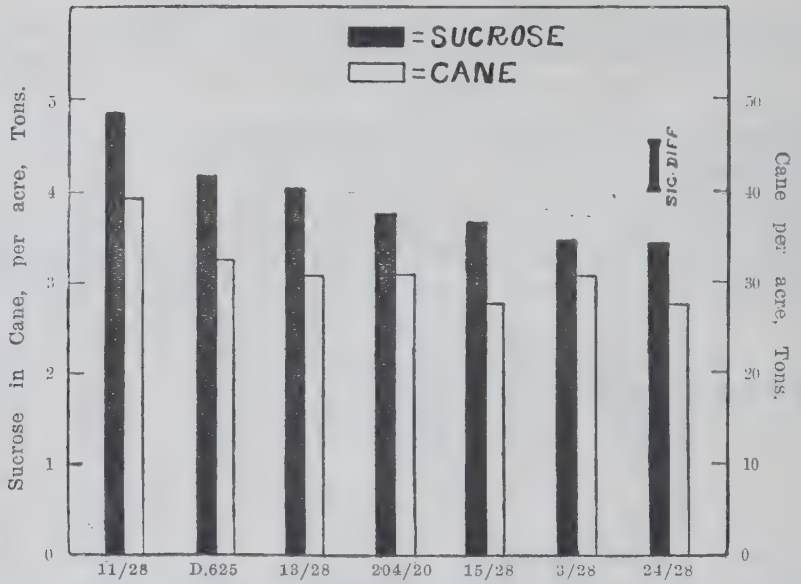

FIG. IV.

Yields of Sucrose and Cane, per acre, from Field 10W., Sophia (Plant Canes).

The results of the plant cane trial in Field 11 West, Sophia, are recorded in Table VI and are shown graphically in Figure V.

TABLE VI.

Location:	SOPHIA, 11 West.						
Age of Canes:	PLANTS, 15.75 months.						
	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields:	D. 625	29.40	13.22	8.01	87.0	3.88	119.02
	D. 404/17	27.74	13.21	6.98	87.0	3.66	112.27
	D. 1221/22	27.56	12.38	7.45	87.1	3.41	104.60
	D. 1159/22	27.36	12.39	9.10	83.0	3.36	103.07
	D. 438/21	22.68	13.09	4.58	88.9	2.97	91.10
	D. 349/20	23.32	12.16	6.41	84.7	2.83	86.81
	D. 8/27	22.43	12.19	9.37	83.5	2.73	83.74
	Mean:					3.26	100.00
	Standard Error:					0.16	4.91
	Significant Difference, 20: 1:					0.46	14.11

Five of the seedlings in this trial are undergoing their first field comparison with the standard cane. Varieties D. 404/17, D. 1221/22 and D. 1159/22 gave yields which were not definitely inferior to D. 625. Seedlings D. 349/20 and

D. 8/27 are not likely to undergo further test.

Field 11 W. experienced normal rainfall for the first ten months of growth. Excessive rain fell during the months of November, December and January.

The topsoil of Field 11 W. is a markedly acidic clay overlying a slightly acidic clay. The organic matter content of the topsoil is low and its carbon : nitrogen ratio is narrow. The salinity of both topsoil and subsoil is below the normal. The theoretical lime requirement of the topsoil is below the average.

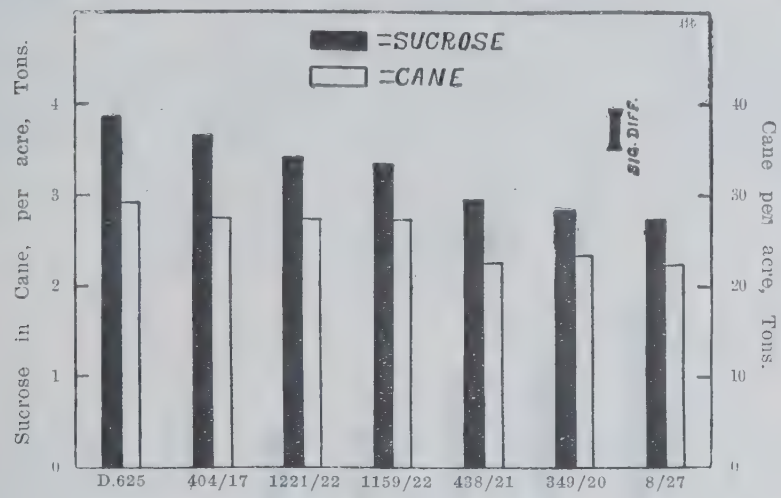

FIG. V.

Yields of Sucrose and Cane, per acre, from Field 11W., Sophia (Plant Canes).

The results of the plant cane trial in Field 14 West, Sophia, are recorded in Table VII and are shown in Figure VI.

TABLE VII.

Location : SOPHIA, 14 West.
Age of Canes : PLANTS, 15.50 months.

	Variety	Cane per Acre, Tons.	Sucrose in Cane, %	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields :	D. 625	45.23	13.20	7.43	85.8	5.99	125.84
	D. 20/28	43.59	12.42	5.84	85.5	5.42	113.87
	G. 119	38.34	13.29	7.16	87.3	5.10	107.14
	D. 8/28	35.66	12.94	7.00	86.2	4.58	96.22
	D. 895/22	36.09	12.47	6.62	86.3	4.50	94.54
	D. 6/28	25.57	11.74	8.81	82.5	3.00	63.03
	Mean :					4.76	100.00
	Standard Error :					0.28	5.88
	Significant Difference, 20 : 1 :					0.89	18.70

The trial contains four hitherto untested varieties, three of which are 1928 seedlings. G. 119 which did so well as an eleven-month plant at Port Mourant (see page 16) did not distinguish itself in this trial. None of the varieties exceeded the yield of the standard cane. Seedling D. 6/28 is not likely to appear in future trials.

Field 14 W. experienced a fairly dry spell during the first four months of growth. For the remainder of the period the rainfall was normally distributed.

The topsoil of Field 14 W. is a markedly acidic heavy silt overlying an alkaline fine silt subsoil. The organic matter content of the topsoil is low, while the carbon : nitrogen ratio is normal. The salinities of both topsoil and subsoil are of an average value. The theoretical lime requirement of the topsoil is below normal.

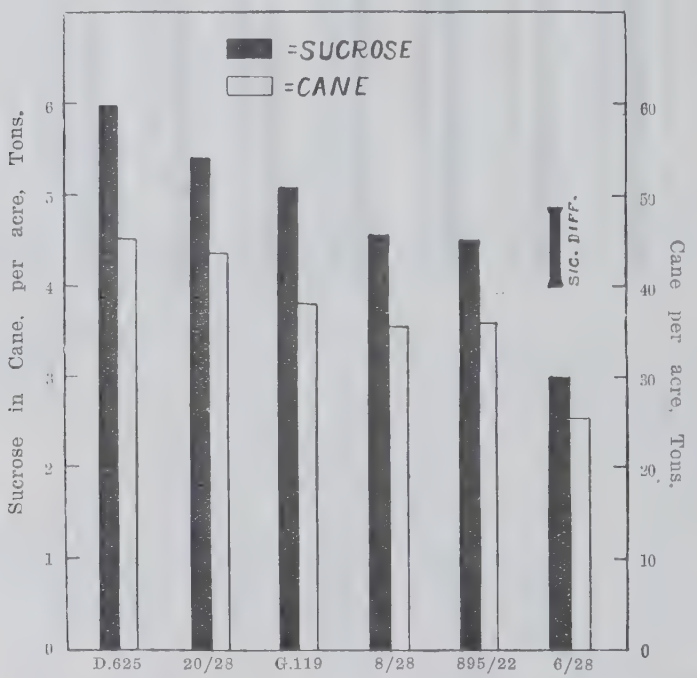

FIG. VI.

Yields of Sucrose and Cane, per acre, from Field 14W., Sophia (Plant Canes).

The results of the plant cane trial in Field 15 West, Sophia, are presented in Table VIII and shown in Figure VII.

TABLE VIII.

Location : SOPHIA, 15 West.

Age of Canes : PLANTS, 15.50 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields :	D. 573/22	37.75	14.05	4.17	89.7	5.30	107.72
	D. 625	40.61	12.42	9.71	86.1	5.05	102.64
	D. 4/28	37.56	13.33	6.70	87.8	5.02	102.03
	D. 10/28	36.74	13.14	4.39	89.2	4.86	98.78
	D. 154/28	37.55	12.92	4.46	87.7	4.84	98.37
	D. 23/28	33.33	14.53	3.92	91.6	4.83	98.17
	D. 1/28	37.38	12.28	7.54	85.9	4.57	92.89
	Mean :					4.92	100.00
	Standard Error :					—	—
	Significant Difference, 20 : 1 :					—	—

This trial contains five of the 1928 seedlings. None of the varieties gave significantly different yields from that of the standard. As usual in the plant cane crop, D. 573/22 gave a lower tonnage but higher sucrose content and juice purity than D. 625. Seedling D. 1/28 has not distinguished itself in this trial. It has, however, given more promising results in other experiments. D. 23/28 has given a low tonnage. Its sucrose content and juice characteristics are superior to those of the standard.

Field 15 W. experienced a fairly dry spell during the first four months of growth. For the remainder of the period the rainfall was normally distributed.

The topsoil of Field 15 W. is a markedly acidic fine silt overlying an alkaline fine silt subsoil. The organic matter content of the topsoil is below the normal while the carbon : nitrogen ratio is narrow. The salinities of both topsoil and subsoil are below normal. The theoretical lime requirements are smaller than the average.

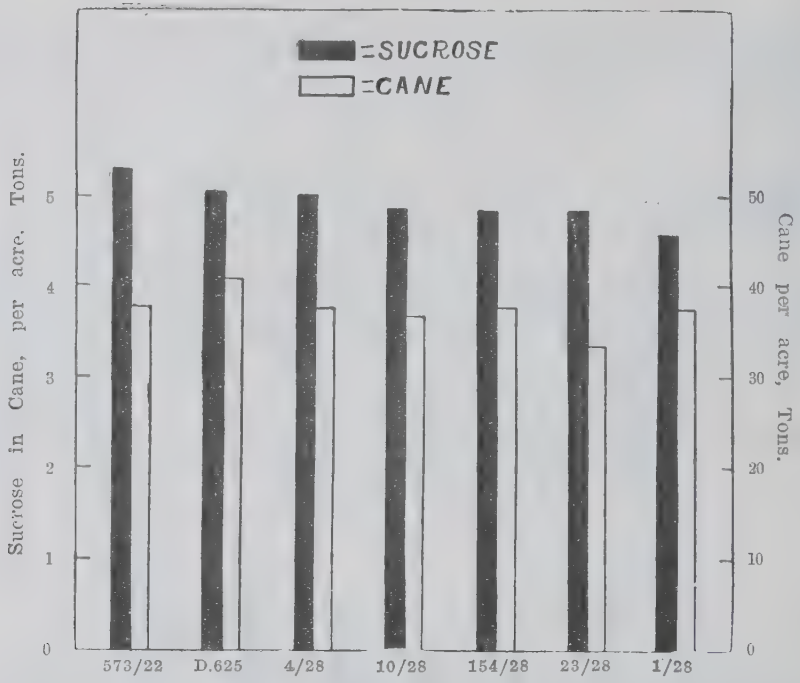

FIG. VII.

Yields of Sucrose and Cane, per acre, from Field 15W., Sophia (Plant Canes).

The results of the plant cane trial in Field 16 West, Sophia, are recorded in Table IX and are graphically presented in Figure VIII.

TABLE IX.

Location :		SOPHIA, 16 West.					
Age of Canes :		PLANTS, 13.50 months.					
	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields :	D. 625	43.99	12.38	13.15	83.7	5.45	108.35
	D. 444/21	44.08	12.30	12.47	85.6	5.44	108.15
	D. 895/22	41.20	12.81	9.45	87.1	5.27	104.77
	D. 207/20	43.23	12.14	9.09	85.4	5.24	104.17
	D. 92/17	40.01	12.57	7.53	87.1	5.03	100.00
	D. 349/20	38.71	12.96	6.18	86.6	5.02	99.80
	D. 1159/22	39.02	12.64	10.72	84.7	4.93	98.01
	D. 73/17	37.90	11.78	8.25	83.9	4.46	88.67
	D. 814/12	35.08	12.57	7.66	86.6	4.41	87.67
	Mean :					5.03	100.00
	Standard Error :					0.26	5.17
	Significant Difference, 20 : 1 :					0.80	15.90

This trial contains four seedlings undergoing their first field trial together with four other varieties which have given promise in other trials. None of the varieties exceeded D. 625 in yield. Seedling D. 73/17 again gave an inferior yield to the standard (see Table III). The performance of D. 814/12 is again disappointing and this seedling will be dropped.

Field 16 W. experienced average rainfall for first eight months of growth. Excessive rain fell during the months of November, December and January. A dry spell preceded reaping.

The topsoil of Field 16 W. is a markedly acidic fine silt overlying an alkaline heavy silt. The organic matter content of the topsoil is low and its carbon : nitrogen ratio is narrow. The salinities of both topsoil and subsoil are below the average. The theoretical lime requirements are below the normal.

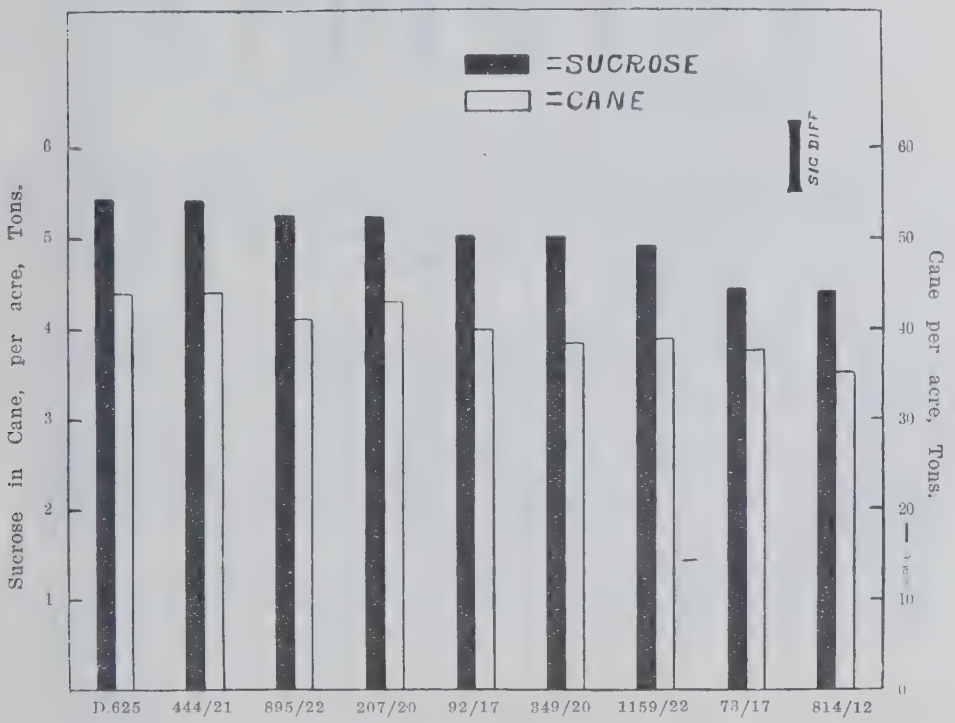

FIG. VIII.

Yields of Sucrose and Cane, per acre, from Field 16W., Sophia (Plant Canes).

The results of the plant cane trial in Field 1 East, Sophia, are recorded in Table X and are also shown in Figure IX.

TABLE X.

Location : SOPHIA, 1 East.

Age of Canes : PLANTS, 17.0 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields:	◇ 10	36.74	11.87	4.82	84.1	4.32	112.21
	D. 602/22	34.80	11.76	3.62	83.4	4.10	106.49
	P.O.J. 2878	35.09	11.60	5.74	83.2	4.09	106.24
	D. 6/21	45.00	8.78	13.30	74.3	4.08	105.97
	D. 195/17	32.19	11.34	7.02	82.9	3.69	95.84
	Berbice	34.50	10.36	4.96	82.1	3.59	93.25
	D. 625	31.64	11.25	8.45	81.0	3.56	92.47
	D. 663/13	31.12	10.81	7.45	82.7	3.37	87.53
	Mean :					3.85	100.00
	Standard Error :					—	—
	Significant Difference, 20 : 1 :					—	—

This trial contains varieties which have appeared in a number of other experiments. While the differences between the varieties of this experiment are not statistically significant, yet Diamond 10 easily assumes the first position. As usual the seedling D. 6/21 gives a heavy tonnage of cane but its sucrose content and juice characteristics are poor.

Field 1 E. received a fair amount of rain during the first three months. During the next five months a fairly dry spell was experienced. For the remainder of the period the rainfall was normally distributed.

The topsoil of Field 1 E. is a slightly acidic heavy silt overlying a similar subsoil. The organic matter content of the topsoil is low, that of the subsoil is above the average. The carbon-nitrogen ratio of the topsoil is normal, that of the subsoil is wide. The salinity of both topsoil and subsoil is very high. The theoretical lime requirements are below the average.

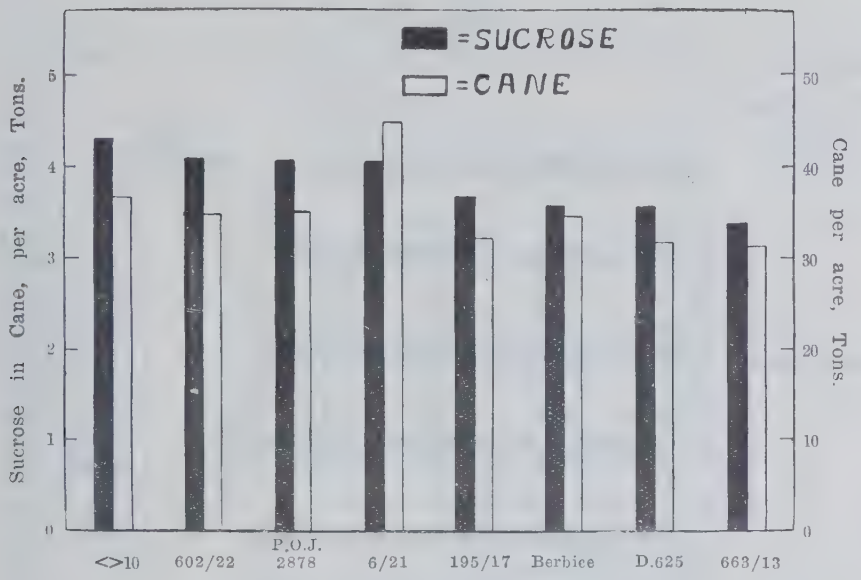

FIG. IX.

Yields of Sucrose and Cane, per acre, from Field 1E., Sophia (Plant Canes).

Details of the plant cane variety trials reaped in Berbice during the period under review are given in Table XI.

TABLE XI.

PLANT CANE VARIETY TRIALS REAPED IN BERBICE.

Estate.	Field.	Age of Cane, Months.	Date of Planting	Date of Reaping.	Number of Varieties.	Number of Replicates.	Type of Layout.
Port Mourant	15 A., O.L.	11.00	17.V.33	20.IV.34	11	6	Randomised Block.
Port Mourant	28 A., Emp.	14.00	9.II.33	4.IV.34	6	6	Latin Square.
Blairmont	H.P. 4	17.75	27.V.32	17.XI.33	9	7	Randomised Block.

The monthly rainfall reported during the progress of the trials together with the mean monthly rainfall recorded at the experimental sites during preceding years appear in Appendix I where the variation from the normal rainfall is indicated for each experiment.

Samples of topsoil and subsoil from the experimental sites were examined in the laboratory. The results appear in Appendix II.

The results of the plant cane trial in Field 15 Ankerville O. L., Port Mourant, are recorded in Table XII and are graphically presented in Figure X.

TABLE XII.

Location : PORT MOURANT, 15 A., O.L.

Age of Canes : PLANTS, 11.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre % Mean.
Mean Yields :	G. 119	41.68	15.40	5.99	92.0	6.45	125.49
	D. 625	43.44	13.72	9.69	86.6	5.94	115.56
	D. 4/28	35.91	14.82	6.73	89.0	5.31	103.31
	D. 15/28	35.78	14.65	5.64	90.6	5.26	102.33
	D. 11/28	37.69	13.92	6.46	89.2	5.25	102.14
	D. 23/28	33.31	15.28	5.29	90.9	5.08	98.83
	D. 9/28	33.93	14.66	5.32	90.8	4.97	96.69
	D. 10/28	34.46	14.10	6.43	89.9	4.87	94.75
	D. 3/28	38.48	12.08	8.85	86.1	4.64	90.27
	D. 24/28	32.68	13.72	6.53	89.4	4.50	87.55
	D. 13/28	31.81	13.40	7.16	87.5	4.24	82.49
	Mean :					5.14	100.00
	Standard Error :					.34	6.61
	Significant Difference, 20 : 1 :					1.08	21.01

This trial contains nine of the 1928 seedlings and one variety introduced from Guadeloupe. The canes were reaped at eleven months and are distinguished by their relatively high juice purities and contents of sucrose. Single puntloads of one or two of the varieties were put through the factory mill and gave very satisfactory results. G. 119 gave a good performance in this trial but it has not maintained this superiority in certain trials described on other pages. It seems probable that this cane has a short growth period and should be reaped early. Both G. 119 and D. 23/28 stand out as sweet canes. Seedlings D. 3/28, D. 24/28 and D. 13/28 gave definitely lower yields than the standard cane.

The experiment received normally distributed rainfall for the first five months. Excessive rain fell during the months of November and December. During the four months preceding reaping a rather dry spell occurred.

The topsoil is a markedly acidic clay overlying a slightly acidic clay subsoil. The organic matter content of the topsoil is below the average, that of the subsoil is above normal. The carbon : nitrogen ratios are of an average value. The salinity of the topsoil is above normal. The theoretical lime requirement is below the average.

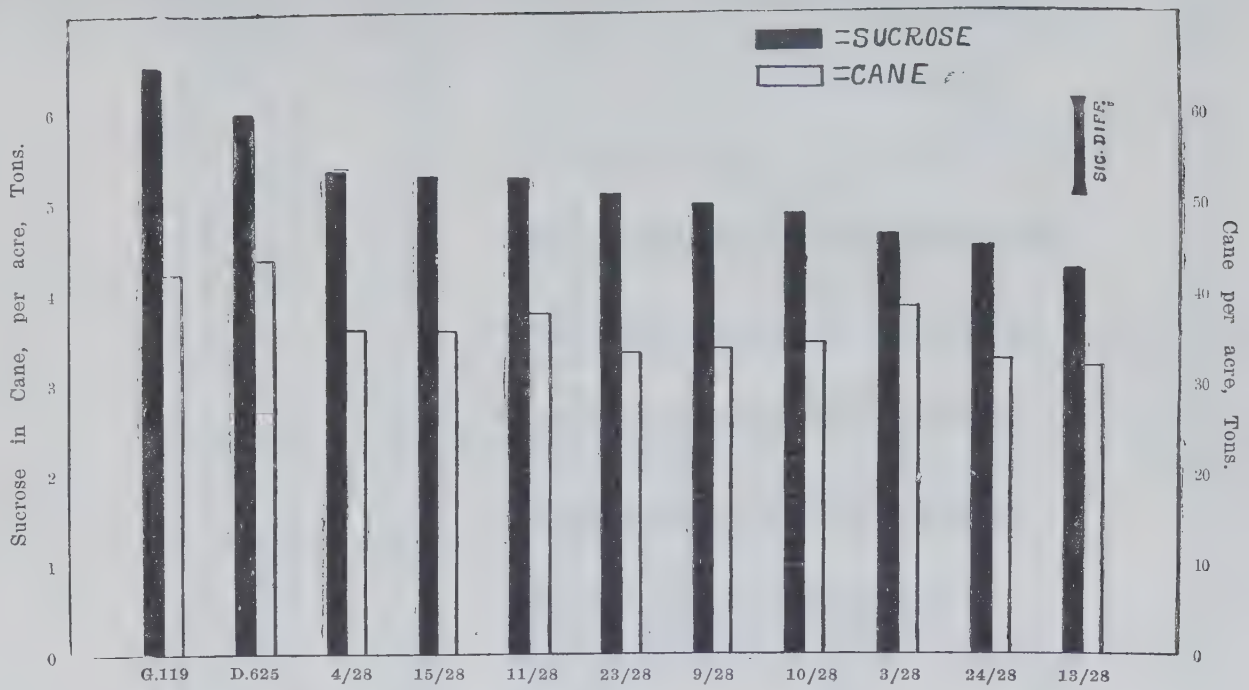

FIG. X.

Yields of Sucrose and Cane, per acre, from Field 15 A., O.L., Port Mourant, (Plant Canes).

The results of the plant cane trial in Field 28, Ankerville Empolder, Port Mourant, are recorded in Table XIII and are graphically presented in Figure XI.

TABLE XIII.

Location : PORT MOURANT, 28 A.E.
Age of Canes : PLANTS, 14.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields :	D. 309/21	45.30	14.39	6.41	87.3	6.52	114.99
	D. 628/21	45.34	13.15	9.96	85.3	5.94	104.76
	D. 438/21	39.95	14.14	5.37	87.6	5.66	99.82
	D. 625	42.31	13.36	11.39	84.6	5.65	99.65
	D. 6/21	51.09	10.79	17.07	77.8	5.51	97.18
	D. 206/21	38.15	12.41	12.99	82.4	4.77	84.13
	Mean :					5.67	100.00
	Standard Error :					—	—
	Significant Difference, 20 : 1 :					—	—

This trial contains three seedlings undergoing their first field comparison with D. 625. Varieties D. 309/21 and D. 628/21 deserve further investigation. Seedling D. 6/21 gives, as usual, a high tonnage of cane possessing very poor juice characteristics. Variety D. 206/21 is not likely to receive much further attention.

The experiment received, during the first nine months of growth, an average amount of rain. During November and December heavy weather intervened, but during the last three months of growth a fairly dry spell was experienced.

The topsoil is a markedly acidic heavy silt overlying a slightly acidic heavy silt subsoil. The organic matter content of the topsoil is below the average, that of the subsoil is above the normal. The carbon : nitrogen ratio of the topsoil is of an average value, that of the subsoil is wider than usual. The salinity of the topsoil is normal, that of the subsoil is below the average. The theoretical lime requirements are lower than usual.

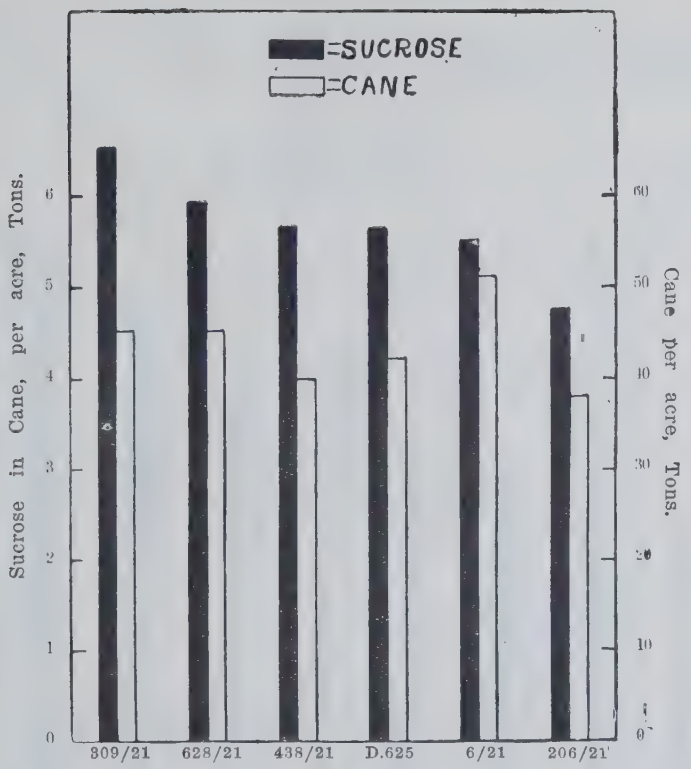

FIG. XI.

Yields of Sucrose and Cane, per acre, from Field 28 A.E., Port Mourant (Plant Canes).

The results of the plant cane trial in Field 4, Haly Polder, Blairmont, are recorded in Table XIV and are also shown in Figure XII.

TABLE XIV.

Location : BLAIRMONT, 4 Haly Polder.
Age of Canes : PLANTS, 17.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields :	P.O.J. 2878	69.31	12.99	8.09	84.0	9.00	124.82
	D. 747/13	65.85	12.63	10.97	82.6	8.29	114.98
	<> 10	59.82	13.81	7.39	85.9	8.27	114.70
	D. 1034/22	61.01	11.68	9.81	83.4	7.11	98.61
	D. 602/22	61.75	11.22	13.13	79.6	6.94	96.26
	D. 857/21	53.14	12.38	11.65	83.0	6.59	91.40
	D. 625	56.54	11.44	14.19	79.8	6.43	89.18
	D. 835/18	52.48	12.22	10.92	84.0	6.42	89.04
	D. 814/12	54.19	10.72	12.68	80.5	5.81	80.58
	Mean :					7.21	100.00
	Standard Error :					0.33	4.58
	Significant Difference, 20 : 1 :					1.01	14.01

This trial contains a number of well-known seedlings and includes two varieties undergoing their first field test. The experiment was reaped at 17.75 months and gave relatively high yields. P.O.J. 2878 did not definitely outyield D. 747/13 and Diamond 10, but all three of these canes were significantly superior to the other seedlings in the trial and would appear to turn over well. Variety D. 747/13 is worthy of further experimentation. The performance of D. 814/12 is once more disappointing.

The experiment received well distributed rainfall throughout its growth period.

The topsoil is a highly acidic pegassy clay overlying a markedly acidic clay subsoil. The organic matter content is high and the carbon : nitrogen ratio is wide, points which indicate the pegassy nature of the soil. The salinities of both topsoil and subsoil are low. The theoretical lime requirements are lower than usual in this class of soil.

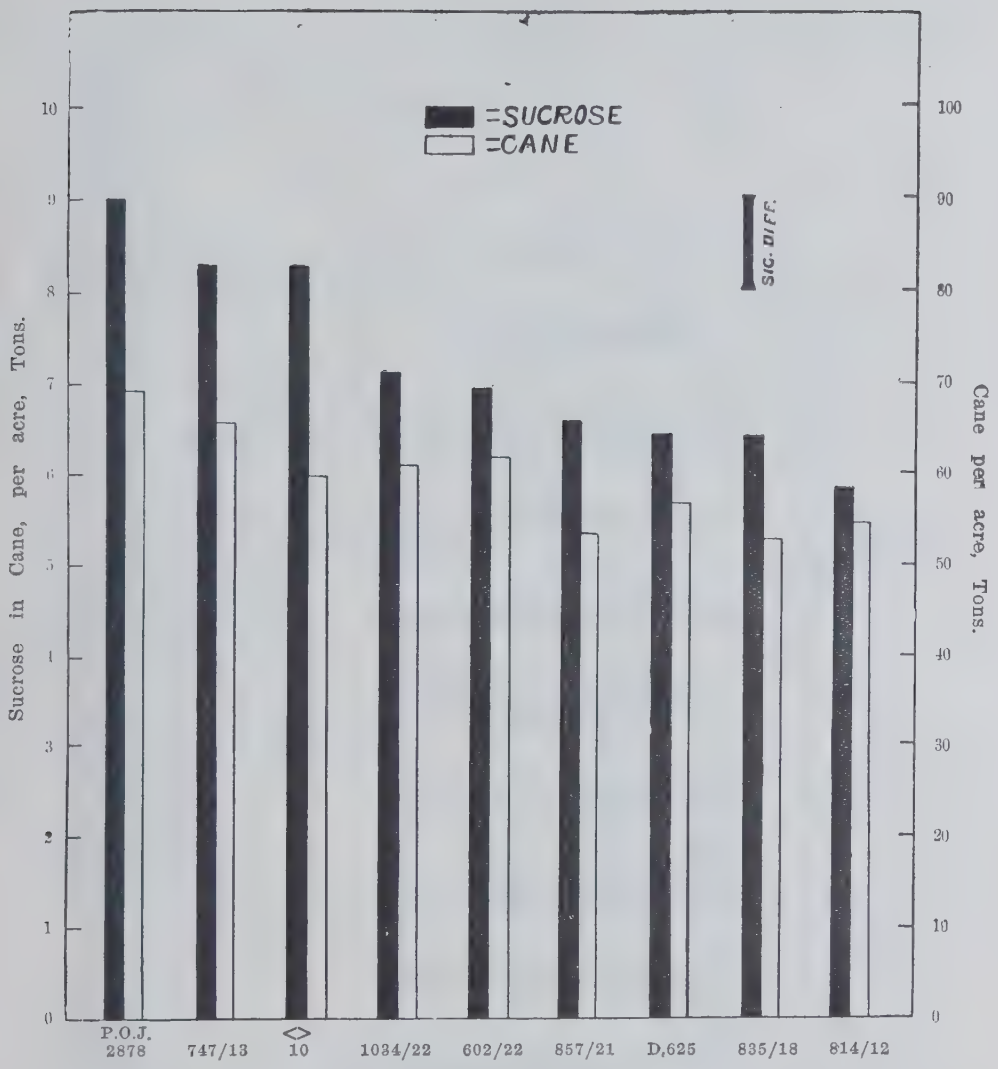

FIG. XII.

Yields of Sucrose and Cane, per acre, from Field 4 H., Blairmont (Plant Canes).

Details of the plant cane trials reaped in East Demerara during the period under review are given in Table XV.

TABLE XV.

PLANT CANE VARIETY TRIALS REAPED IN EAST DEMERARA.

Estate.	Field.	Age of cane, Months.	Date of Planting.	Date of Reaping.	Number of Varieties.	Number of Replicates.	Type of Layout.
Non Pareil	59 E.	15.00	26.VII.32	25.X.33	11	8	Randomised Block.
Ogle	61 O.	13.00	26.VIII.32	27.IX.33	8	8	Latin Square.

The monthly rainfall reported during the progress of the trials together with the mean monthly rainfall recorded at the experimental sites during preceding years is given in Appendix I where the variation from the normal rainfall is indicated for each experiment.

Composite samples of topsoil and subsoil from the experimental sites were examined in the laboratory. The results appear in Appendix II.

The yields of the plant cane crop in Field 59 E., Non Pareil, are presented in Table XVI and are also shown in Figure XIII.

TABLE XVI.

Location : NON PAREIL, 59 East.
Age of Canes : PLANTS, 15.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields :	D. 11/28	33.67	12.67	8.98	85.3	4.28	124.78
	D. 625	32.90	12.50	11.96	82.2	4.10	119.53
	D. 9/28	28.81	12.83	7.16	86.0	3.70	107.87
	◇ 10	25.08	14.32	7.14	86.3	3.58	104.37
	D. 23/28	24.18	14.77	6.23	89.3	3.56	103.79
	D. 13/28	29.00	11.79	9.37	82.5	3.44	100.29
	D. 4/28	26.36	12.86	8.78	84.5	3.40	99.13
	D. 24/28	27.31	12.00	6.96	85.7	3.26	95.04
	D. 15/28	23.30	13.30	7.10	87.0	3.09	90.09
	D. 3/28	25.88	11.16	9.39	82.5	2.87	83.67
	D. 10/28	18.72	12.84	8.02	84.2	2.41	70.26
	Mean :					3.43	100.00
	Standard Error :					0.13	3.79
	Significant Difference, 20 : 1 :					0.40	11.66

This trial contains nine of the 1928 seedlings. They are being compared with the standard, D. 625, and with Diamond 10. The seedling D. 11/28 does not definitely outyield D. 625, but both of these canes give higher yields than Diamond 10 and the other seedlings. D. 23/28 again stands out as a sweet cane. Seedling D. 10/28 has given a poor yield and is not likely to receive further attention.

The experiment received an average amount of rain during the month following planting. For the next three months dry weather prevailed. For the remainder of the growth period the rainfall was normally distributed.

The topsoil is a highly acidic clay overlying a markedly acidic clay subsoil. The organic matter content of the topsoil is low. The carbon : nitrogen ratios are narrow. The salinity of the topsoil is low, that of the subsoil is high. The theoretical lime requirements are above the average.

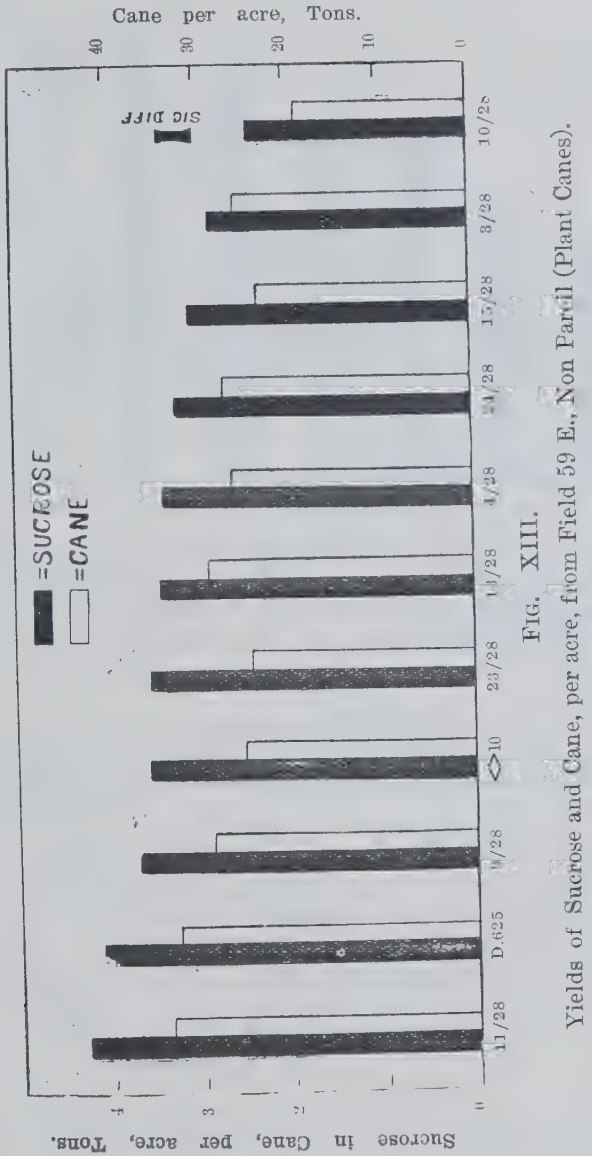

FIG. XIII.

Yields of Sucrose and Cane, per acre, from Field 59 E., Non Parcil (Plant Canes).

The results of the plant cane trial in Field 61, Ogle, are recorded in Table XVII and are graphically presented in Figure XIV.

TABLE XVII.

Location : OGLE, 6 1 Ogle.
Age of Canes : PLANTS, 13.00 months.

	Variety.	Cane per Acre. Tons.	Sucrose in Cane, %	Glucose Ratio,	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields :	P.O.J. 2878	52.94	10.91	15.62	77.2	5.71	138.59
	D. 1/28	43.68	11.47	10.15	81.7	5.02	121,84
	D. 13/28	41.95	10,98	10.18	78.4	4.62	112.14
	D. 625	45.20	10.02	13.72	74.3	4.54	110.19
	D. 3/28	39.79	9.70	13.85	76.8	3.85	93.45
	D. 4/28	32.57	11.48	11.59	80.9	3.72	90.29
	G. 119	25.38	11.64	11.64	82.0	2.95	71.60
	D. 602/22	26.31	9.68	16.69	74.5	2.54	61.65
	Mean :					4.12	100.00
	Standard Error :					0.25	6.07
	Significant Difference, 20 : 1 :					0.77	18.69

This trial contains four of the 1928 seedlings together with G. 119, which did so well at Port Mourant. P.O.J. 2878 and D. 1/28 appear at the top of the table, the former definitely outyielding the standard. G. 119 and D. 602/22 have given disappointing yields. The latter has been given extended trial and will be dropped.

The experiment experienced dry weather for the first three months after planting. For the remainder of the period the rainfall was normally distributed but usually slightly in excess of the average. Heavy rain was experienced during September.

The topsoil is a highly acidic fine silt overlying a markedly acidic clay subsoil. The organic matter content of the topsoil is normal, that of the subsoil is above the average. The carbon : nitrogen ratios are wide. The salinity of the topsoil is normal, that of the subsoil is below the average. The theoretical lime requirement of the topsoil is below normal, that of the subsoil is above the average.

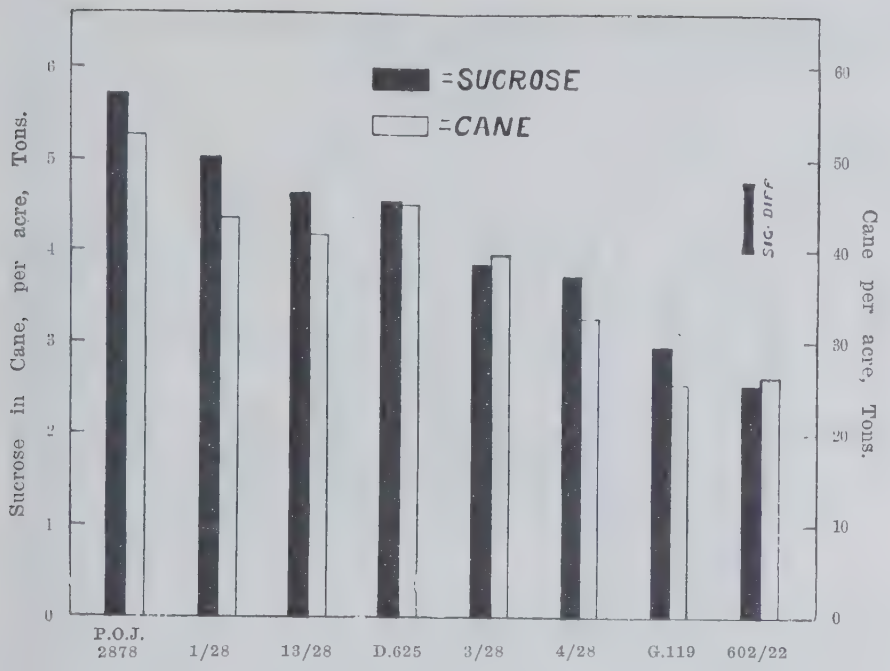

FIG. XIV.

Yields of Sucrose and Cane, per acre, from Field 61 O., Ogle (Plant Canes).

Details of the plant cane variety trials reaped in West Demerara during the period under review are given in Table XVIII.

TABLE XVIII.

PLANT CANE VARIETY TRIALS REAPED IN WEST DEMERARA.

Estate.	Field.	Age of cane, Months.	Date of		Number of		Type of Layout.
			Planting.	Reaping.	Varieties.	Replicates.	
Wales	4 B.	11.75	30.III.33	19.III.34	8	6	Randomised Block.
Uitvlugt	13 E.	14.75	29.VII.32	20.X.33	11	7	Randomised Block.

The monthly rainfall reported during the progress of the trials together with the mean monthly rainfall recorded at the experimental sites during preceding years is presented in Appendix I where the variation from the normal rainfall is indicated for each experiment.

Composite samples of topsoil and subsoil from the experimental sites have been examined in the laboratory. The results are recorded in Appendix II.

The results of the plant cane trial in Field 4, Bellevue, Wales, are presented in Table XIX and are also shown in Figure XV.

TABLE XIX.

Location : WALES, Bellevue 4.

Age of Canes : PLANTS, 11.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields :	<> 10	32.52	13.04	9.94	88.2	4.24	125.82
	D. 625	36.76	10.03	31.64	72.2	3.68	109.20
	P.O.J. 2878	27.50	13.50	12.12	86.4	3.67	108.90
	Co. 210	31.07	11.23	10.92	83.9	3.50	103.86
	Co. 213	29.52	11.78	9.62	85.3	3.43	101.78
	P.O.J. 253	25.83	12.27	8.48	87.7	3.16	93.77
	Co. 281	22.02	12.84	6.88	90.3	2.81	83.38
	D. 814/12	21.80	11.25	14.48	83.0	2.45	72.70
	Mean :					3.37	100.00
	Standard Error :					0.20	5.93
	Significant Difference, 20 : 1 :					0.64	18.99

This trial contains the three Indian varieties which gave such promising yields in the trial in Field 2 West, Sophia (see page 4). Diamond 10 does not definitely outyield D. 625 or P.O.J. 2878 ; it gives, however, a better return than the remaining varieties in the trial. The seedling D. 814/12 once more gives a disappointing performance. The Indian canes have not given such promising yields as in the previous trial. They merit, however, further attention.

The experiment received for the first six months of growth normally distributed rainfall. During the months of October, November, December and January the rainfall was excessive. The two months preceding reaping were fairly dry.

The topsoil of the experimental site is a markedly acidic clay overlying a similar subsoil. Both topsoil and subsoil contain a fair amount of organic matter of rather wide carbon : nitrogen ratio, characteristics which suggest a pegassy nature. The salinity is low and the theoretical lime requirements are high.

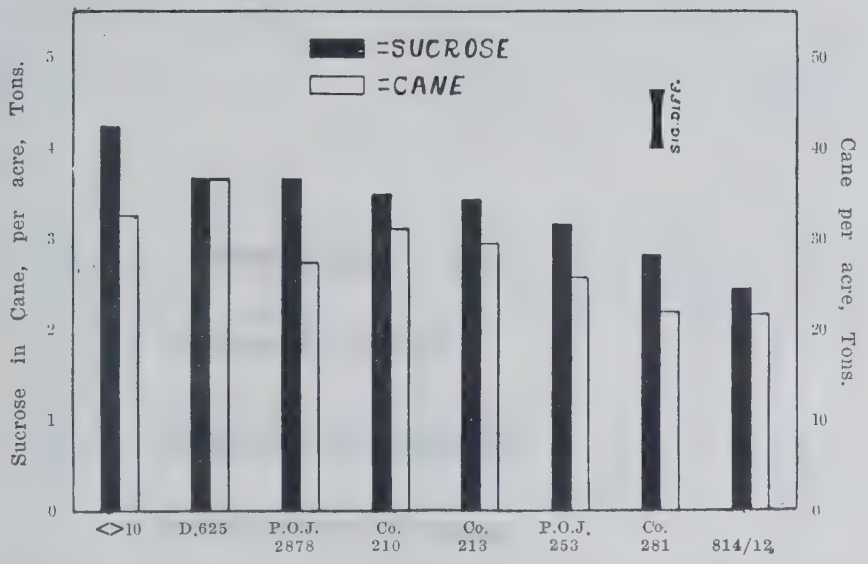

FIG. XV.

Yields of Sucrose and Cane, per acre, from Field 4 B., Wales (Plant Canes).

The results of the plant cane trial in Field 13 E., Uitvlugt, are recorded in Table XX and are also shown in Figure XVI.

TABLE XX.

Location :	UITVLUGT, 13 East.						
Age of Canes :	PLANTS, 14.75 months.						
	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.
Mean Yields :	D. 11/28	57.84	11.09	9.52	83.9	6.40	142.86
	D. 9/28	53.04	11.28	7.88	86.2	5.94	132.59
	D. 4/28	43.52	12.24	9.41	85.0	5.32	118.75
	D. 625	51.32	10.10	14.03	78.9	5.18	115.62
	D. 3/28	49.41	9.75	13.82	79.3	4.80	107.14
	D. 10/28	41.81	10.53	9.68	82.6	4.37	97.54
	D. 23/28	35.29	11.47	7.98	85.3	4.04	90.18
	D. 24/28	35.80	10.79	8.67	84.1	3.87	86.38
	D. 13/28	35.97	10.77	9.53	82.9	3.87	86.38
	D. 602/22	29.79	10.61	12.47	79.3	3.20	71.43
	D. 15/28	23.19	10.02	10.40	80.8	2.34	52.23
	Mean :					4.48	100.00
	Standard Error :					0.22	4.91
	Significant Difference, 20 : 1 :					0.66	14.73

This trial contains nine of the 1928 seedlings compared with the standard D. 625. Seedlings D. 11/28 and D. 9/28 gave promising results and while there is no difference, in this trial, between the two yet both are definitely superior to the standard. Varieties D. 24/28, D. 13/28, D. 602/22 and D. 15/28 gave

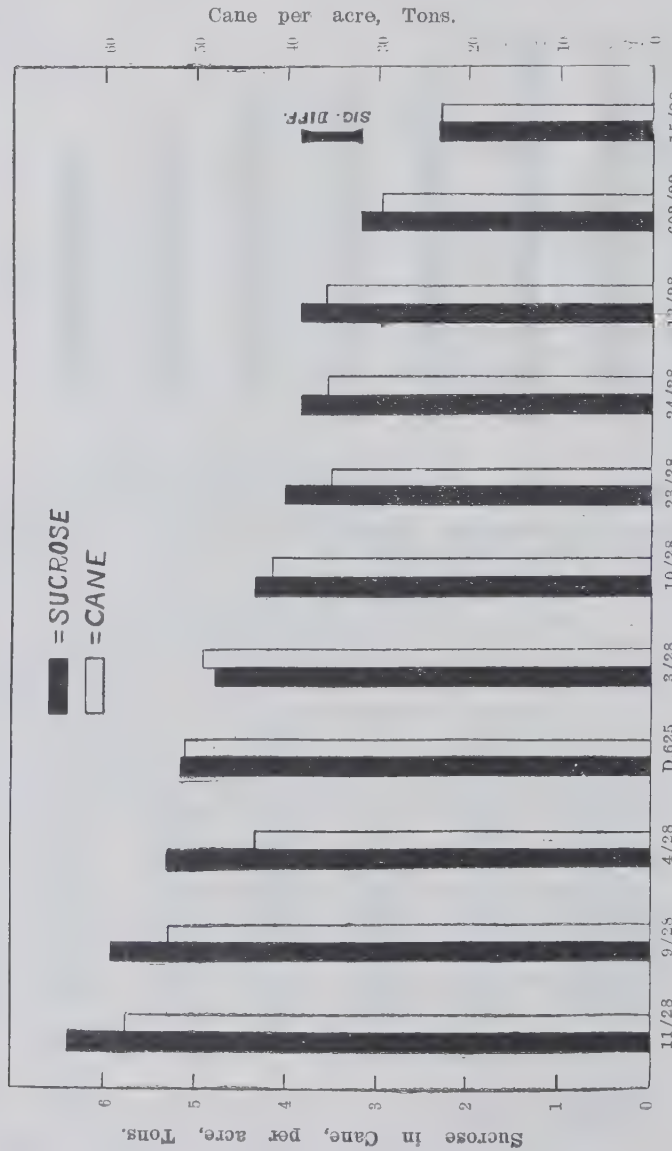

FIG. XVI.

Yields of Sucrose and Cane, per acre, from Field 13 E., Uitvlugt (Plant Canes).

disappointing returns. None of the seedlings, with the possible exception of D. 4/28, has a very desirable sucrose content.

The experiment received a fair amount of rain for the month following planting. For the next three months a spell of dry weather was experienced. A period of normally distributed rainfall followed. During the month preceding reaping excessive rain was experienced.

The topsoil of the experimental area is a highly acidic clay overlying a markedly acidic clay subsoil. The organic matter content of the topsoil is low, that of the subsoil is high. The carbon:nitrogen ratio is narrower than usual. The salinity is above the average. The theoretical lime requirements are below the normal.

SUB-SECTION B.—FIRST RATOON VARIETY TRIALS.

Details of the first ratoon variety trials reaped at Sophia Experiment Station during the period under review are presented in Table XXI.

TABLE XXI.

FIRST RATOON VARIETY TRIALS REAPED AT SOPHIA EXPERIMENT STATION.

Field.	Age of cane, Months.	Date of		Number of		Type of Layout.
		Previous Reaping.	Reaping.	Varieties.	Replicates.	
4 East	12.00	28.XI.32	30.XI.33	9	7	Randomised Block.
5 „	12.00	13.IX.32	12.IX.33	8	7	Randomised Block.
6 „	12.00	9.IX.32	14.IX.33	5	7	Randomised Block.
14 „	12.00	22.XI.32	23.XI.33	6	6	Latin Square.

Reference to Appendix I will furnish the detailed records of actual rainfall during the course of the experiments together with a comparison with the normal rainfall.

Certain soil data regarding these experimental sites were published in *Sugar Bulletin* No. I, Table III. It was not possible at the time of publication to provide full details of the examination of the samples withdrawn from the experimental sites and values for the organic matter content and theoretical lime requirements were approximated from the results of a preliminary soil survey of Sophia which did not necessarily involve the actual fields under consideration. The detailed results of the examination of samples from the actual experimental sites are now presented in Appendix II.

The results of the first ratoon trial in Field 4 East, Sophia, are recorded in Table XXII, together with the combined results of the two crops. These latter results are also shown in Figure XVII.

TABLE XXII.

Location : SOPHIA, 4 East.

Age of Canes : 1ST RATOONS, 12.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results Plants and 1st Ratoons. Variety.	Sucrose in Cane per Acre, Tons.
Mean Yields :	D. 625 P.M.	33.37	12.18	10.42	83.7	4.11	115.45	D. 92/17	10.11
	D. 625	33.44	12.36	10.39	84.1	4.11	115.45	D. 52/20	10.10
	D. 1431/22	33.26	11.33	8.76	84.4	3.76	105.62	D. 625	9.83
	D. 52/20	29.81	12.28	8.18	86.3	3.66	102.81	D. 625 P.M.	9.76
	D. 92/17	30.48	11.46	9.52	83.3	3.51	98.60	D. 1431/22	9.61
	D. 604/20	28.11	12.01	9.73	84.7	3.39	95.22	D. 71/20	8.97
	D. 71/20	30.64	10.98	8.51	84.0	3.39	95.22	D. 593/22	8.79
	D. 593/22	27.93	11.05	8.77	83.7	3.11	87.36	D. 604/20	8.74
	D. 1221/22	27.12	11.16	8.26	85.2	3.01	84.55	D. 1221/22	7.55
	Mean :					3.56	100.00		
	Standard Error :					0.23	6.46		
	Significant Difference, 20 : 1 :					0.72	20.22		

(*Plant cane results reported in Sugar Bull. No. I, p. 5*).

D. 625 and D. 625 (Port Mourant strain) gave the best ratoon crops in the trial. They were placed fourth and sixth in the plant cane results but in combined figures now available they have risen to third and fourth places. The results suggest that there is no difference in yield capacity between the Port Mourant strain of D. 625 and the ordinary standard. Varieties D. 92/17 and D. 52/20 which did so well in the plant cane crop, proved disappointing ratooners. Seedlings D. 71/20, D. 593/22, D. 604/20 and D. 1221/22 have given poor results while D. 620/21 gave such a poor spring that it was immediately discarded.

The experiment received during the growth period 9.60 inches more than the average rainfall. The rain was well distributed throughout the year but was slightly excessive during the month preceding reaping.

The topsoil is a markedly acidic clay overlying a slightly acidic clay subsoil. The organic matter content is low and the carbon:nitrogen ratio is normal. The salinity is above the average. The theoretical lime requirements are low,

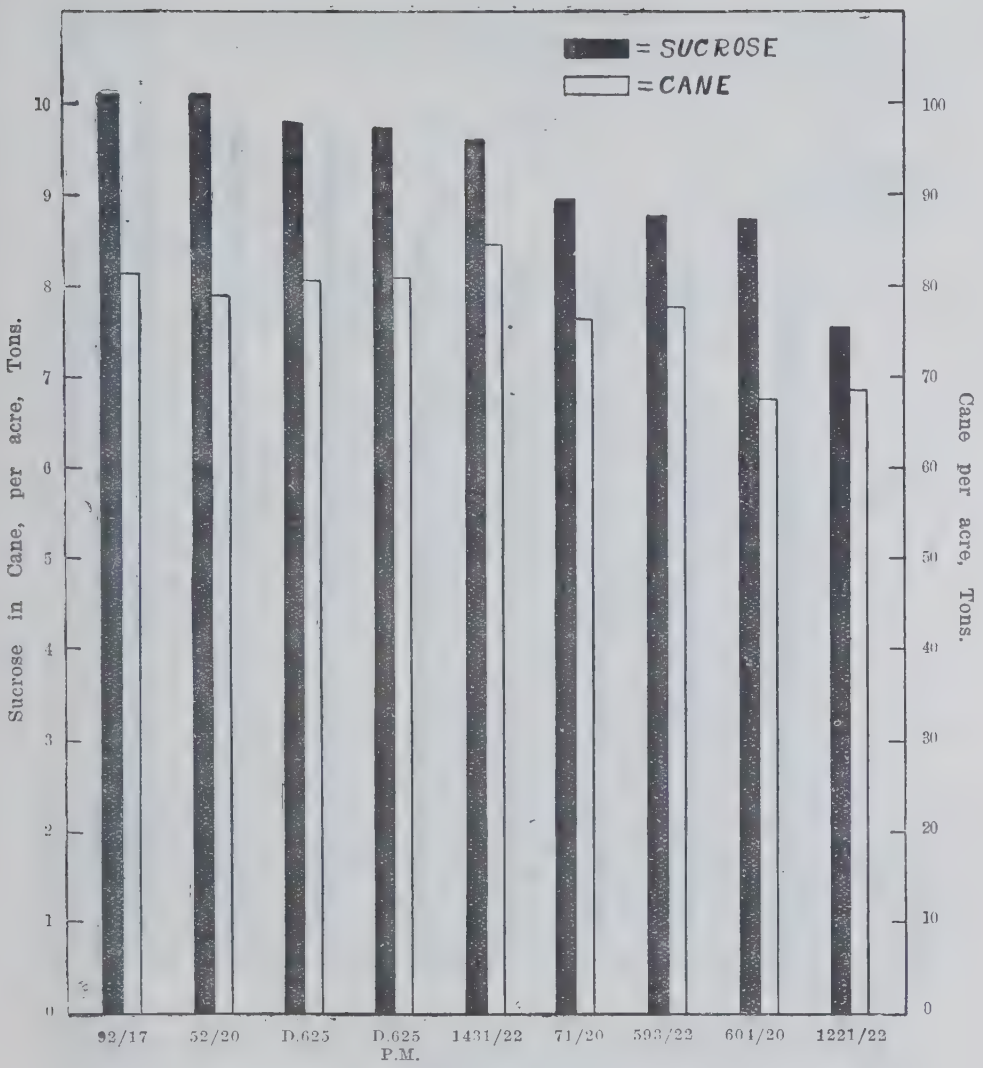

FIG. XVII.

Total Yields of Sucrose and Cane, per acre, from Field 4 E., Sophia (Plant Canes and First Ratoons).

The first ratoon results of the trial in Field 5 East, Sophia, are presented in Table XXIII together with the combined results for the two crops. The latter results are also shown in Figure XVIII.

TABLE XXIII.

Location : SOPHIA, 5 East.
Age of Canes : 1ST RATOONS, 12.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results Plants and 1st Ratoons. Variety.	Combined Results Plants and 1st Ratoons. Sucrose in Cane per Acre, Tons.
Mean Yields :	<> 10	31.39	12.38	5.99	85.0	3.89	123.49	D. 53/27	9.52
	D. 625	30.04	11.68	8.96	81.7	3.51	111.43	D. 625	9.07
	D. 53/27	29.21	11.88	7.55	81.9	3.45	109.52	<> 10	8.98
	D. 6/21	34.84	8.67	15.66	71.7	3.03	96.19	P.O.J. 2714	7.68
	D. 602/22	26.90	11.21	6.02	81.7	3.01	95.56	D. 403/18	7.39
	S.C. 12 (4)	26.07	11.02	5.00	84.2	2.88	91.43	D. 6/21	7.33
	P.O.J. 2714	26.25	10.58	7.48	80.7	2.79	88.57	D. 602/22	7.29
	D. 403/18	25.62	10.28	9.32	80.2	2.63	83.49	S.C. 12 (4)	7.10
	Mean :					3.15	100.00		
	Standard Error :					0.21	6.79		
	Significant Difference, 20 : 1 :					0.66	20.95		

(*Plant cane results reported in Sugar Bull. No. I, p. 5*).

Diamond 10 has given a good account of itself as a ratoon. It leads D. 625 by 12 per cent. and D. 53/27 by 14 per cent. These differences are not statistically significant but are suggestive. Due to a heavy plant cane crop, seedling D. 53/27 appears at the top of the table of combined results. As usual, D. 6/21 gives a heavy tonnage with poor juice characteristics. Varieties B. 74 and I.C.T.A. 36 gave poor yields in the plant cane crop and their spring was so unpromising that they were discarded.

The experiment received 0.75 inches less rain than the average. During the fortnight following the reaping of the plant canes a dry spell was experienced and this was followed by a further droughty period in November. During the remainder of the period the rainfall was well distributed, a slight excess occurring during the month preceding reaping.

The topsoil of the experimental site is a markedly acidic clay overlying a similar subsoil. The organic matter content and the carbon:nitrogen ratios are of an average value. The salinity is above the normal. The theoretical lime requirements are low.

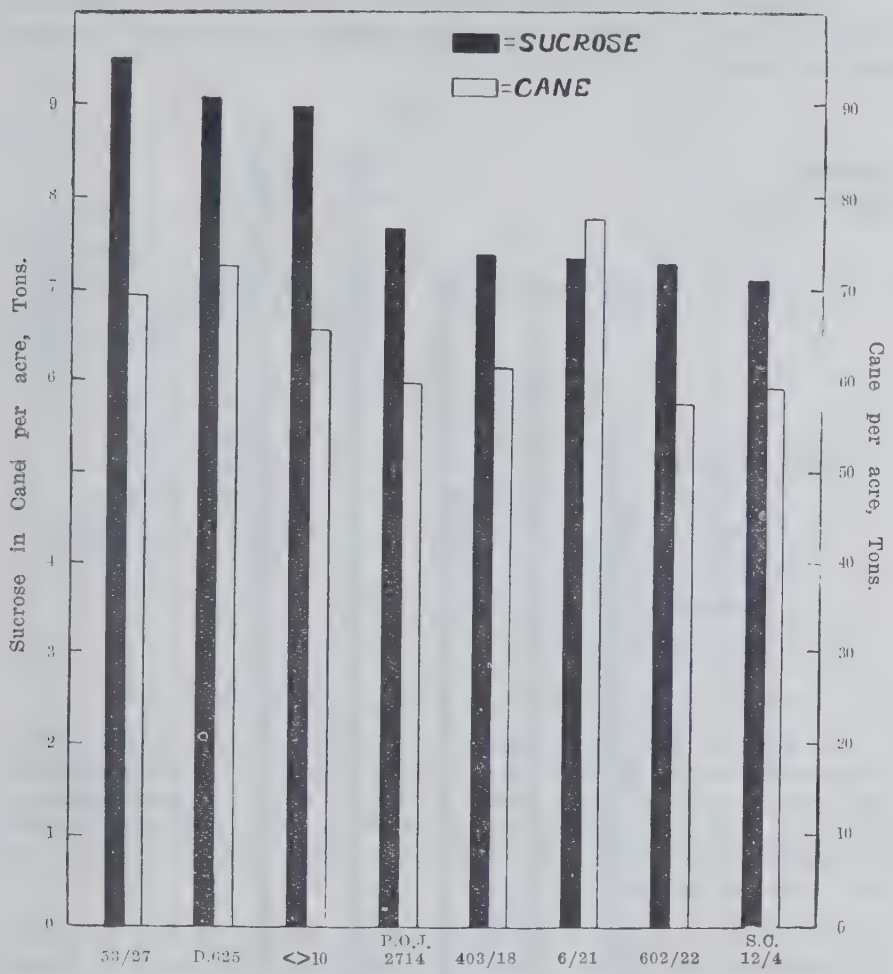

FIG. XVIII.

Total Yields of Sucrose and Cane, per acre, from Field 5 E., Sophia (Plant Canes and First Ratoons).

The results of the first ratoon crop in Field 6 East, Sophia, are presented in Table XXIV together with the combined results of the two crops. The latter results are graphically presented in Figure XIX.

TABLE XXIV.

Location : SOPHIA, 6 East.

Age of Canes : 1ST RATOONS, 12.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results Plants and 1st Ratoons. Variety.	Combined Results Plants and 1st Ratoons. Sucrose in Cane per Acre, Tons.
Mean Yields :	D. 625	28.45	11.60	7.05	81.6	3.30	110.00	S.W. 3	9.52
	S.W. 3	24.37	12.65	3.72	87.4	3.08	102.67	D. 625	9.44
	B.H. 10 (12)	23.47	12.90	4.72	87.4	3.02	100.67	P.O.J. 1499	8.19
	P.O.J. 1499	24.00	12.04	4.95	84.1	2.89	96.33	P.O.J. 213	7.31
	P.O.J. 213	27.59	9.88	5.69	80.2	2.73	91.00	B.H. 10 (12)	6.23
	Mean :					3.00	100.00		
	Standard Error :					...	...		
	Significant Difference, 20 : 1 :					...	...		

(*Plant cane results reported in Sugar Bull. No. I, p. 5*),

In this trial three Javan canes are compared with D. 625 and B.H. 10/12. The standard cane has produced the best ratoon crop. S.W. 3, which proved the best plant cane, is slightly superior to D. 625 when combined results are inspected. S.W. 3 gave in both crops a low glucose ratio. B.H. 10/12 produced a fairly good first ratoon crop but a poor plant cane yield gives it the last place in the combined table.

During the fortnight following the reaping of the plant canes a dry spell was experienced and this was followed by a further droughty period in November. During the remainder of the period the rainfall was well distributed, a slight excess occurring during the month preceding reaping.

The topsoil of the experimental area is a markedly acidic clay overlying a markedly acidic heavy clay subsoil. The organic matter content of the topsoil is above the average and its carbon : nitrogen ratio is wide. The salinity is above the normal. The theoretical lime requirements are low.

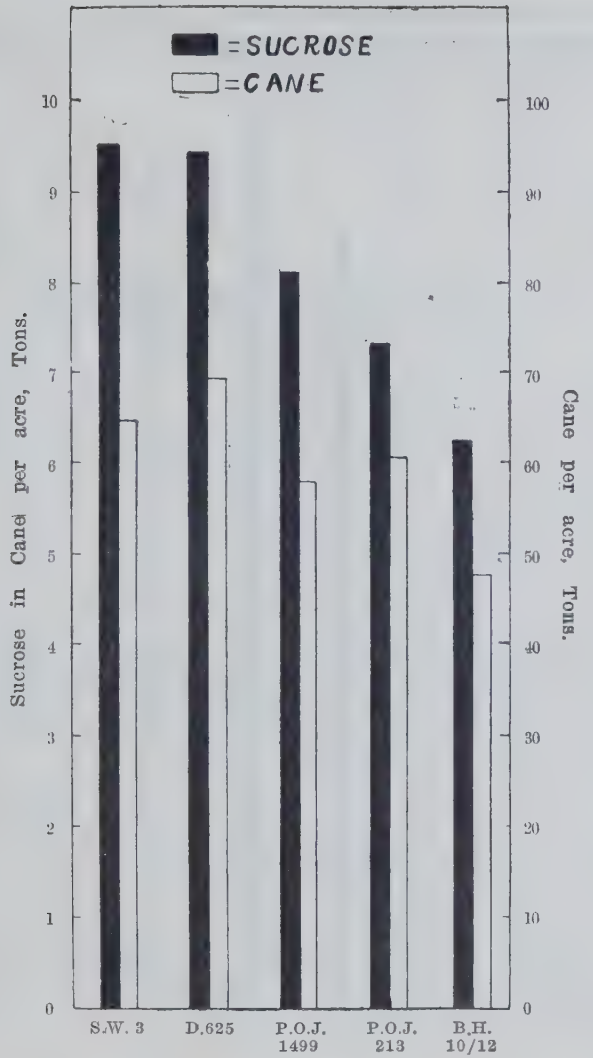

FIG. XIX.

Total Yields of Sucrose and Cane, per acre, from Field 6 E., Sophia (Plant Canes and First Ratoons).

The results of the first ratoon trial in Field 14 East, Sophia, are presented in Table XXV together with the combined results of the two crops. The latter results are presented graphically in Figure XX.

TABLE XXV

Location : SOPHIA, 14 East.
Age of Canes : 1ST RATOONS, 12.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results Plants and 1st Ratoons. Variety.	Combined Results Plants and 1st Ratoons. Sucrose in Cane per Acre, Tons.
Mean Yields :	D. 625	33.75	12.39	12.24	84.6	4.17	105.04	D. 625	9.88
	D. 602/22	31.39	12.07	8.16	86.1	3.78	95.21	D. 602/22	8.71
	Mean :					3.97	100.00		
	Standard Error :					...	...		
	Significant Difference, 20 : 1 :					...	...		

(*Plant cane results reported in Sugar Bull. No. I, p. 7*).

In this trial D. 625 and D. 602/22 are compared at three different row spacings. When the results for all spacings are combined D. 625 gives a 10 per cent. higher yield than D. 602/22 in the first ratoon crop. The difference is not statistically significant. In the two crops the standard cane has given over one ton sucrose per acre more than D. 602/22.

The experiment received during the growth period 9.60 inches more than the average rainfall. The rain was well distributed throughout the year but was slightly excessive during the month preceding reaping.

The topsoil of the experimental site is a markedly acidic fine silt overlying a slightly acidic fine silt subsoil. The organic matter content is of an averge value possessing a normal carbon : nitrogen ratio. The salinity is below the average. The theoretical lime requirement of the topsoil is low.

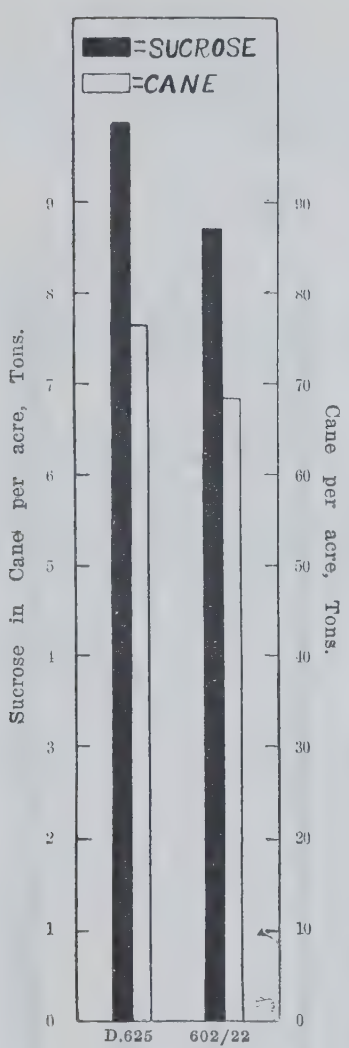

FIG. XX.

Total Yields of Sucrose and Cane, per acre, from Field 14 E., Sophia (Plant Canes and First Ratoons).

Details of the first ratoon variety trials reaped in Berbice during the period under review are presented in Table XXVI.

TABLE XXVI.

FIRST RATOON VARIETY TRIALS REAPED IN BERBICE.

Estate.	Field.	Age of cane, Months.	Date of Previous Reaping.	Date of Reaping.	Number of Varieties.	Number of Replicates.	Type of Layout.
Port Mourant	8 A.	12.75	15.IX.32	6.X.33	10	7	Randomised Block.
Port Mourant	14 A. O.L.	12.00	14.IV.33	12.IV.34	7	7	Randomised Block.
Blairmont	18 R.	12.75	18.IX.32	12. X. 33	12	7	Randomised Block.

Reference to Appendix I furnishes the detailed records of actual rainfall during the course of these experiments together with a comparison of the normal rainfall.

The soils of the experimental areas have been previously described in *Sugar Bulletin* I, pp. 17, 31 and *Sugar Bulletin* II, p. 15. Certain laboratory results are recorded in greater detail in Appendix II.

The results of the first ratoon trial in Field 8 Ankerville, Port Mourant, are recorded in Table XXVII together with the combined results for the two crops The latter results are shown graphically in Figure XXI.

TABLE XXVII.

Location : PORT MOURANT, 8 Ankerville.

Age of Canes : 1ST RATOONS, 12.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results Plants and 1st Ratoons. Variety.	Combined Results Plants and 1st Ratoons. Sucrose in Cane per Acre, Tons.
Mean Yields :	D. 666/18	38.31	11.17	9.91	78.7	4.22	111.94	D. 625	11.16
	D. 835/18	34.07	12.16	8.59	81.9	4.13	109.55	D. 666/18	11.12
	D. 625	32.29	12.63	8.93	81.1	4.03	106.90	D. 835/18	9.32
	D. 679/20	29.17	13.72	6.97	85.3	4.01	106.37	D. 424/21	9.21
	D. 695/13	32.29	12.10	6.91	83.5	3.90	103.45	D. 602/22	9.15
	S.C. 12 (4)	30.63	12.16	4.64	84.4	3.69	97.88	D. 679/20	9.11
	D. 424/21	26.81	13.21	6.41	84.9	3.50	92.84	D. 695/13	8.91
	B.H. 10 (12)	26.34	13.20	5.69	85.8	3.45	91.51	D. 557/20	8.88
	D. 557/20	30.20	11.43	8.48	80.7	3.41	90.45	S.C. 12 (4)	8.79
	D. 602/22	27.67	12.20	6.47	83.6	3.35	88.86	B.H. 10 (12)	8.50
	Mean :					3.77	100.00		
	Standard Error :					...	...		
	Significant Difference, 20 : 1 :					...	...		

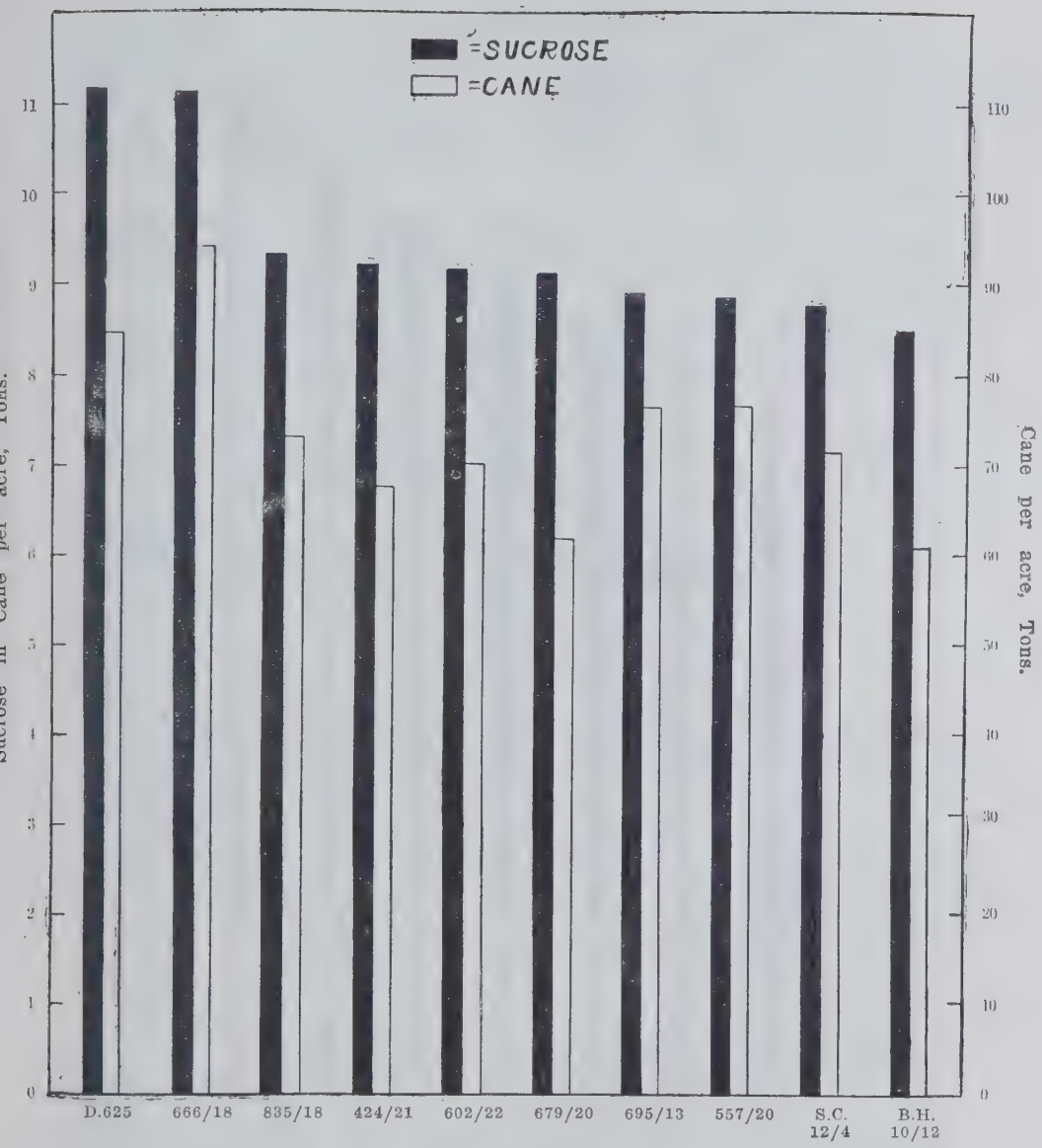

FIG. XXI.

Total Yields of Sucrose and Cane, per acre, from Field 8 A., Port Mourant (Plant Canes and First Ratoons).

(*Plant cane results reported in Sugar Bull. No. I, p. 32*).

In the first ratoon crop D. 666/18 heads the list followed closely by D. 835/18 and D. 625. D. 679/20 gave indications in both crops of being a sweet cane. In the combined results D. 625 and D. 666/18 come first and are superior to the remaining seedlings which do not differ greatly from each other in yield. Seedlings D. 689/13 and D. 571/20 gave disappointing plant cane yields and were subsequently discarded.

The trial experienced a dry November. During May, June and August the rainfall was in excess of the normal. During the whole growth period the experiment received 8.60 inches more rain than the average.

The results of the first ratoon crop in Field 14 Ankerville Old Land, Port Mourant, are recorded in Table XXVIII together with the combined results of the two crops. The latter results are shown graphically in Figure XXII.

TABLE XXVIII.

Location : PORT MOURANT, 14 A.O.L.
Age of Canes 1ST RATOONS, 12.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 2 Crops, Plants and 1st Ratoons. Variety.	Sucrose in Cane per Acre, Tons.
Mean Yields :	D. 625	42.75	14.92	10.03	86.9	6.38	112.13	D. 241/21	14.12
	D. 241/21	38.76	15.98	5.10	91.1	6.19	108.79	D. 625	13.18
	D. 835/18	40.53	15.10	6.74	90.1	6.13	107.73	D. 695/13	12.52
	D. 695/13	39.82	15.03	6.14	90.5	5.97	104.92	D. 835/18	12.16
	D. 794/18	39.14	14.13	7.13	87.3	5.52	97.01	D. 794/18	11.36
	D. 661/21	31.62	15.33	5.63	90.1	4.85	85.24	D. 661/21	10.97
	D. 611/18	30.91	15.43	5.72	89.8	4.76	83.66	D. 611/18	10.56
	Mean :					5.69	100.00		
	Standard Error :					0.28	4.92		
	Significant Difference, 20 : 1 :					0.87	15.29		

(*Plant cane results reported in Sugar Bull. No. II, p. 15*).

The first ratoon crop of this experiment gave a heavy yield. The standard cane tops the list and is closely followed by D. 241/21 which gave a very heavy yield as plant cane. In the combined results this cane is easily the best, giving 1 ton sucrose per acre more than its nearest rival D. 625. Seedlings D. 613/21 and D. 246/20 gave disappointing returns as plants and were discarded from the first ratoon trial. It is interesting to note that both of the crops in this field and the plant cane crop in the adjoining field (see page 16) have given high sucrose contents and desirable juice characteristics.

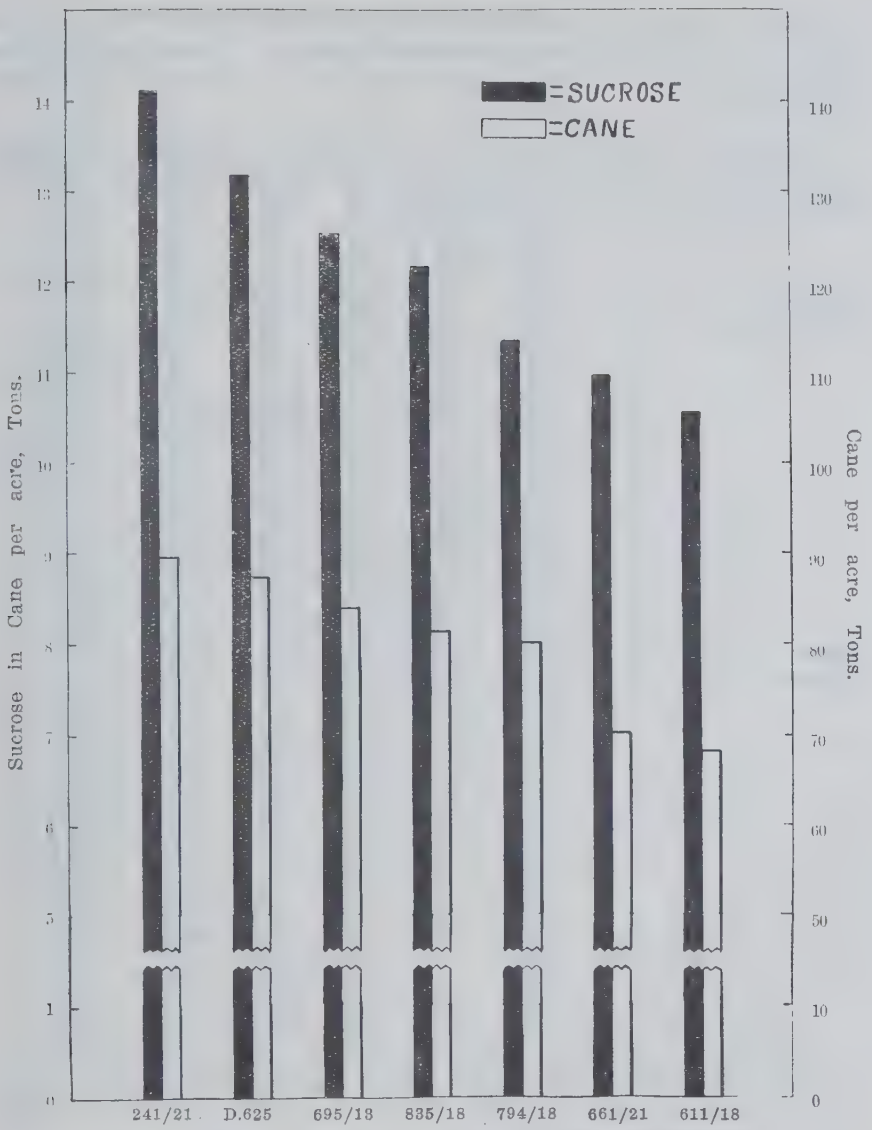

FIG. XXII.

Total Yields of Sucrose and Cane, per acre, from Field 14 A.O.L., Port Mourant (Plant Canes and First Ratoons).

The trial experienced a considerable amount of rain during May, June and August, and in December very heavy rainfall occurred. A fairly dry period was noted during March. The experiment received 32.53 inches more rain than is usually expected.

The results of the first ratoon crop in Field 18 R., Blairmont, are recorded in Table XXIX together with the combined results for the two crops. The latter results are shown graphically in Figure XXIII.

TABLE XXIX.

Location: BLAIRMONT, 18 Riverside.
Age of Canes: 1ST RATOONS, 12.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results Plants and 1st Ratoons. Variety.	Combined Results Plants and 1st Ratoons. Sucrose in Cane per Acre, Tons.
Mean Yields:	◇ 10	36.02	14.36	6.30	89.1	5.16	131.97	◇ 10	11.23
	D. 424/21	32.97	13.05	6.89	87.4	4.31	110.23	D. 424/21	10.20
	D. 625	35.01	12.00	11.27	81.7	4.19	107.16	D. 835/18	9.77
	D. 835/18	33.73	12.11	9.82	83.6	4.08	104.35	D. 666/18	9.55
	D. 351/20	29.91	13.45	7.29	88.4	4.01	102.56	D. 351/20	9.53
	D. 684/21	36.75	10.21	13.31	73.7	3.77	96.42	D. 625	9.40
	D. 557/20	29.51	12.75	7.19	86.5	3.75	95.91	D. 695/13	8.89
	D. 666/18	34.32	10.79	12.26	79.2	3.71	94.88	D. 684/21	8.72
	D. 814/12	30.34	12.24	8.91	83.9	3.70	94.63	D. 814/12	8.60
	D. 663/13	30.56	11.92	10.25	82.3	3.64	93.09	D. 557/20	8.54
	D. 695/13	27.75	12.20	9.26	84.7	3.39	86.70	D. 602/22	8.36
	D. 602/22	26.81	12.16	8.66	84.0	3.28	83.89	D. 663/13	8.01
	Mean:					3.91	100.00		
	Standard Error:					0.15	3.84		
	Significant Difference, 20: 1:					0.45	11.51		

(Plant cane results reported in Sugar Bull. No. I, p. 18).

Diamond 10 is an outstandingly better first ratooner than any other seedling in this experiment and in the combined results leads the other varieties by over 1 ton of sucrose per acre. D. 424/21 has done well in this trial while D. 602/22 has given disappointing results.

The young spring experienced fairly dry weather for the first two months. The May—June rains were slightly heavier than usual, otherwise the rainfall was well distributed. The experiment received during the whole of the growth period an excess of 4.03 inches over the normal.

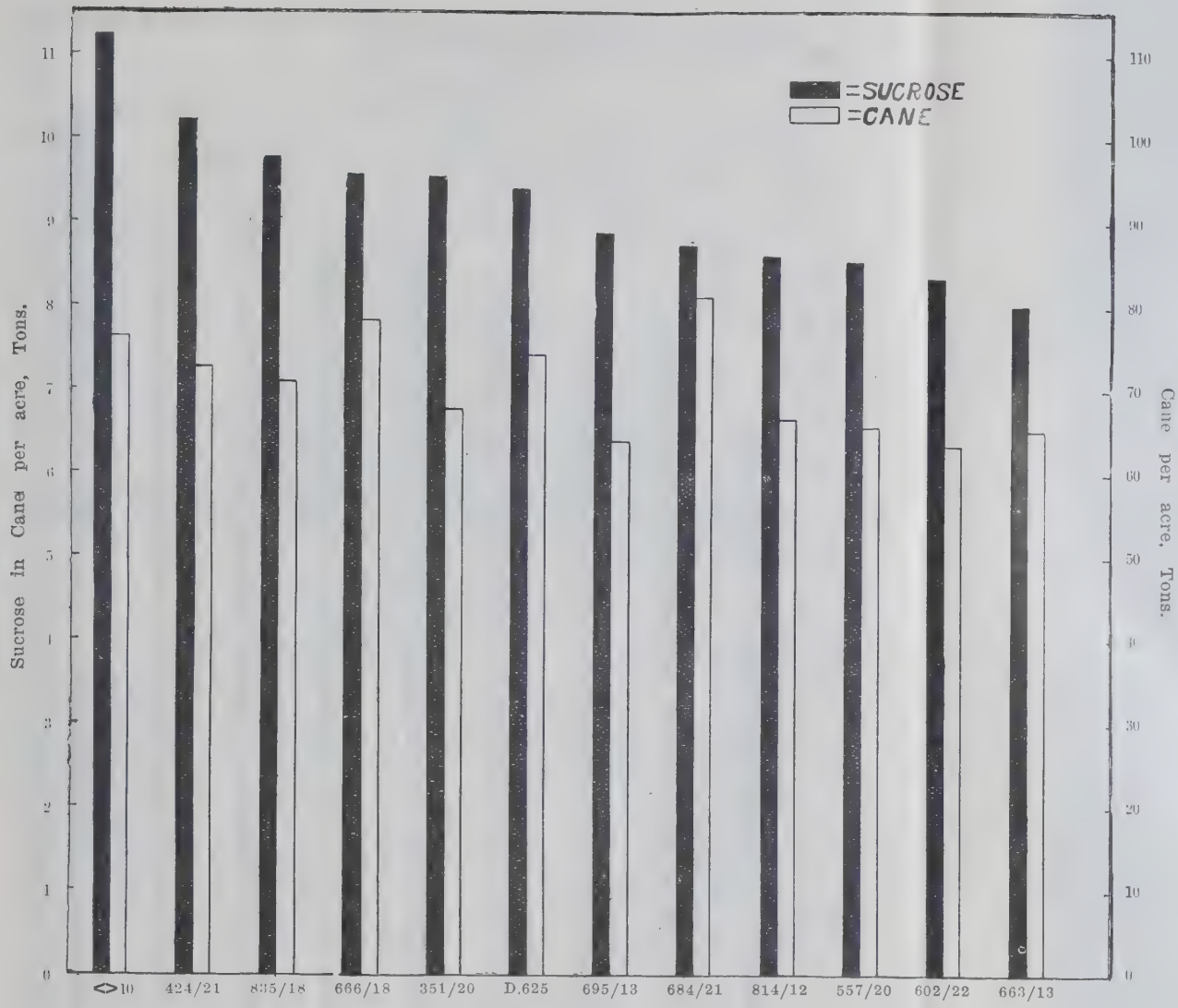

FIG. XXIII.

Total Yields of Sucrose and Cane, per acre, from Field 18 R., Blairmont (Plant Canes and First Ratoons).

Details of the first ratoon variety trials reaped in East Demerara during the period under review are recorded in Table XXX.

TABLE XXX.

FIRST RATOON VARIETY TRIALS REAPED IN EAST DEMERARA.

Estate.	Field.	Age of cane, Months.	Date of Previous Reaping.	Date of Reaping.	Number of Varieties.	Number of Replicates.	Type of Layout.
Lusignan	22 B.M.R.	12.00	24.VIII.32	18.VIII.33	10	7	Randomised Block.
Lusignan	38 A.	9.75	18. IV. 33	6.II.34	10	7	Randomised Block.
Non Pariel	14 E.	12.50	24.XI.32	12.XII.33	9	5	Randomised Block.
Diamond	89 G.D.	13.00	11. X. 32	14.XI.33	6	7	Randomised Block.

The actual rainfall experienced during the growth periods is compared in Appendix I with the mean monthly rainfall for the various sites.

The results of the first ratoon crop in 14 E. Non Pareil are presented in Table XXXI together with the combined results. The latter are also presented graphically in Figure XXIV.

TABLE XXXI.

Location: NON PAREIL, 14 Enterprise.
Age of Canes: 1ST RATOONS, 12.50 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results Plants and 1st Ratoons. Variety.	Combined Results Plants and 1st Ratoons. Sucrose in Cane per Acre, Tons.
Mean Yields:	P.O.J. 2878	27.41	12.50	6.30	85.3	3.43	131.42	P.O.J. 2878	10.87
	D. 666/18	26.45	11.04	9.88	81.9	2.92	111.88	D. 424/21	9.59
	D. 625	23.34	11.65	9.85	82.2	2.72	104.21	<> 10	9.51
	D. 424/21	22.98	11.56	7.62	85.6	2.65	101.53	D. 602/22	9.31
	S.C. 12 (4)	21.68	11.48	7.27	86.2	2.49	95.40	D. 625	9.25
	D. 309/22	21.70	11.04	5.84	84.5	2.40	91.95	D. 666/18	8.64
	D. 602/22	19.83	11.73	8.35	85.5	2.33	89.27	D. 309/22	8.44
	P.O.J. 213	25.02	9.18	7.77	80.3	2.29	87.74	S.C. 12 (4)	8.42
	<> 10	18.78	12.05	5.98	85.8	2.27	86.97	P.O.J. 213	7.14
	Mean:					2.61	100.00		
	Standard Error:					0.14	5.36		
	Significant Difference, 20: 1:					0.46	17.62		

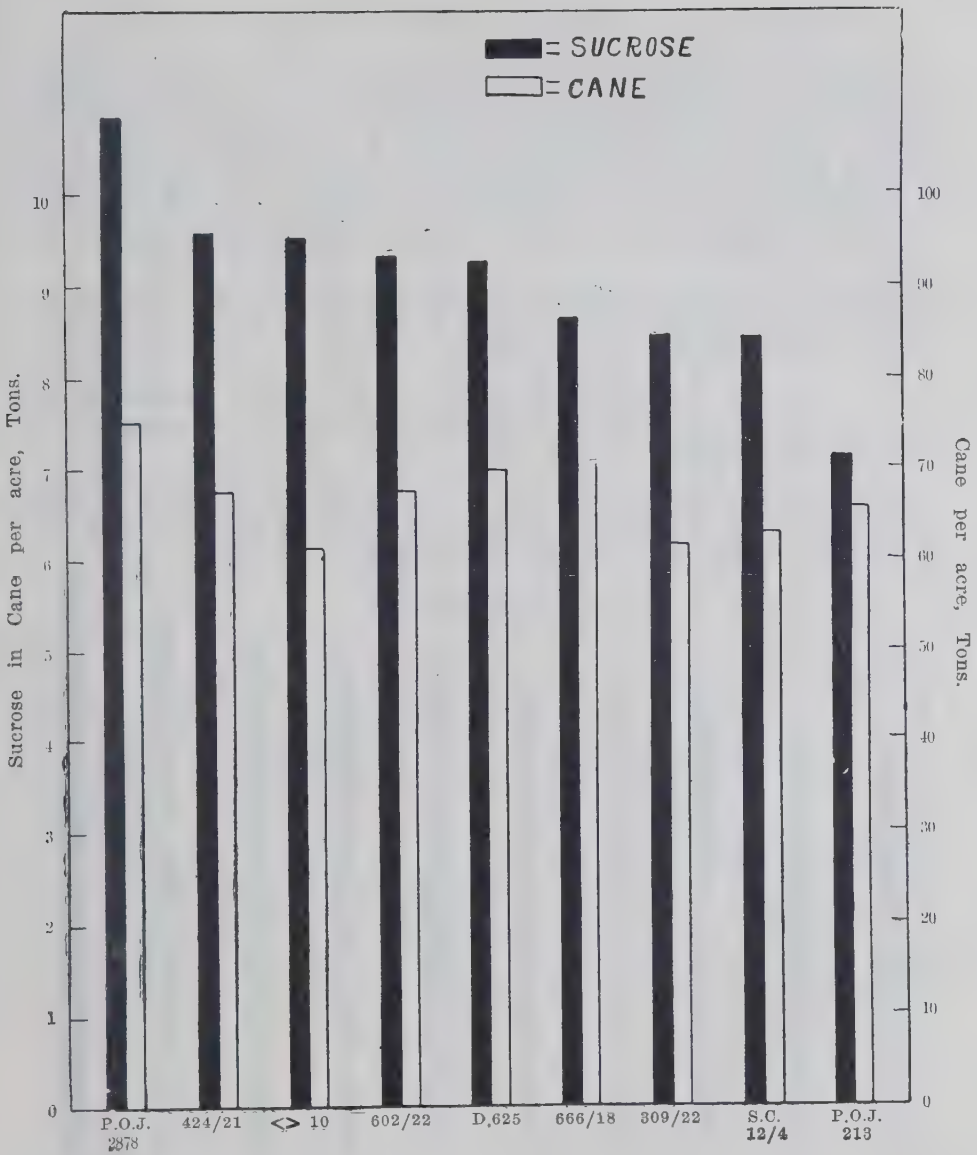

FIG. XXIV.

Total Yields of Sucrose and Cane, per acre, from Field 14 Ent., Non Pareil (Plant Canes and First Ratoons).

(*Plant cane results reported in Sugar Bull. No. I, pp. 28-30*).

P.O.J. 2878, which came first in the plant cane harvest, gave the best ratoon crop and was significantly better than the other canes in the trial. As usual D. 666/18 gave a poorer plant cane yield than D. 625, but was superior to the standard in the first ratoon crop. The surprise of this trial is the poor ratoon crop of Diamond 10. In the combined results P.O.J. 2878 is better by over one ton of sucrose per acre than its nearest rival D. 424/21. P.O.J. 213 has proved very disappointing. Seedlings D. 699/20 and D. 53/27 gave poor plant cane yields and an unpromising spring. They were discarded from the ratoon trial.

The rainfall figures indicate that the trial experienced well distributed rainfall during the greater part of the period. The six weeks preceding reaping were marked by excessive precipitation.

The soils of the experimental area have been already discussed (*Sugar Bulletin* I, p. 28). The detailed results of their laboratory examination will be found in Appendix II.

The results of the first ratoon crop in Field 22 B.M.R., Lusignan, are recorded in Table XXXII together with the combined results for the two crops. The latter results are presented graphically in Figure XXV.

TABLE XXXII.

Location : LUSIGNAN, 22 B.M.R.

Age of Canes : 1ST RATOONS, 12.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results Plants and 1st Ratoons. Variety.	Sucrose in Cane per Acre, Tons.
Mean Yields :	D. 666/18	20.60	9.50	14.02	76.4	1.95	118.90	D. 666/18	6.55
	D. 695/13	18.41	10.45	11.20	80.1	1.90	115.85	D. 625	5.97
	D. 625	18.10	10.14	14.19	77.4	1.82	110.98	D. 241/21	5.61
	D. 557/20	16.23	10.76	7.45	82.7	1.75	106.71	D. 699/20	5.52
	D. 424/21	15.62	10.75	9.20	81.9	1.69	103.05	D. 695/13	5.46
	D. 241/21	16.81	9.74	13.80	78.0	1.65	100.61	D. 424/21	5.22
	D. 699/20	12.99	11.57	7.11	85.4	1.51	92.07	D. 557/20	5.19
	S.C. 12 (4)	14.03	10.19	7.45	82.8	1.43	87.19	D. 602/22	5.19
	B.H. 10 (12)	12.34	11.31	8.41	83.4	1.40	85.37	B.H. 10 (12)	4.85
	D. 602/22	11.99	10.39	10.62	79.2	1.26	76.83	S.C. 12(4)	4.42
	Mean :					1.64	100.00		
	Standard Error					0.13	7.93		
	Significant Difference, 20 : 1					0.41	25.00		

(*Plant cane results reported in Sugar Bull. I, pp. 25—27*).

The first ratoons of this experiment gave disappointing yields; D. 666/18, which came first in the plant cane trial, retains its position in the first ratoon crop. The standard cane came second in the list of combined results. Seedling D. 241/21, which gave such a promising performance at Port Mourant, has not proved so successful in this trial. S.C. 12/4 and B.H. 10/12 have given very disappointing returns. Seedlings D. 689/13 and D. 613/21 were discarded from the first ratoon trial.

The rainfall figures show that the ratoons experienced a very dry spell for the first three months. For the remainder of the experimental period the rainfall was well distributed and slightly in excess of the average.

The soils of the experimental area have been already discussed (*Sugar Bull.* I, p. 25). The detailed results of their laboratory examination appear in Appendix II.

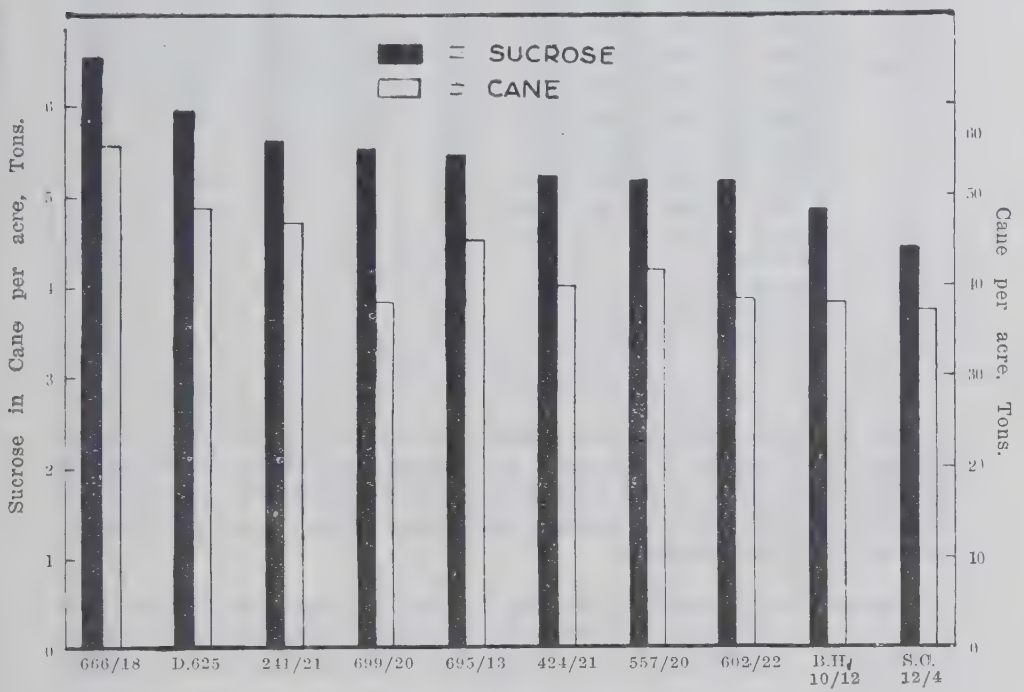

FIG. XXV.

Total Yields of Sucrose and Cane, per acre, from Field 22 B.M.R., Lusignan (Plant Canes and First Ratoons).

The results of the first ratoon crop in Field 38 A., Lusignan, are presented in Table XXXIII together with the combined results of the two crops. The latter results are shown graphically in Figure XXVI.

TABLE XXXIII.

Location : LUSIGNAN, 38 Annandale.

Age of Canes : 1ST RATOONS, 9.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results Plants and 1st Ratoons. Variety.	Combined Results Plants and 1st Ratoons. Sucrose in Cane per Acre, Tons.
Mean Yields :	D. 663/13	21.84	11.64	13.40	83.0	2.55	123.19	D. 628/21	6.78
	D. 835/18	22.71	10.28	17.37	79.3	2.33	112.56	D. 663/13	6.41
	D. 628/21	22.34	10.18	14.25	77.2	2.27	109.66	D. 625	9.29
	D. 602/22	22.59	9.63	20.55	75.9	2.17	104.83	D. 602/22	9.21
	D. 92/21	20.99	10.26	14.52	78.7	2.14	103.38	D. 835/18	6.09
	D. 648/22	19.95	10.28	15.45	79.6	2.05	99.03	D. 92/21	6.05
	D. 695/13	19.88	10.03	13.32	80.2	1.99	96.14	D. 573/22	5.94
	D. 625	20.29	9.74	24.66	73.6	1.97	95.17	D. 648/22	5.81
	D. 573/22	18.91	10.31	13.41	80.0	1.94	93.72	D. 695/13	5.59
	D. 163/21	21.36	6.23	45.48	58.9	1.34	64.73	D. 163/21	5.25
	Mean:					2.07	100.00		
	Standard Error:					0.09	4.35		
	Significant Difference, 20: 1:					0.28	13.53		

(*Plant cane results reported in Sugar Bull. II, pp. 12—14*).

The first ratoons in this trial suffered badly during the heavy inundations of January. The experiment was cut at 9.75 months. The figures for the sucrose content, juice purity and glucose ratio indicate the immaturity of the canes. D. 628/21 which came first in the plant cane results retains its position when the combined yields are considered.

The rainfall figures indicate that the first ratoons experienced excessive rain throughout the growth period, with the exception of a dry spell in September and October. Very heavy rains were experienced during November, December and January.

The soils of the experimental area have been previously described in (*Sugar Bull.* II, p. 13).

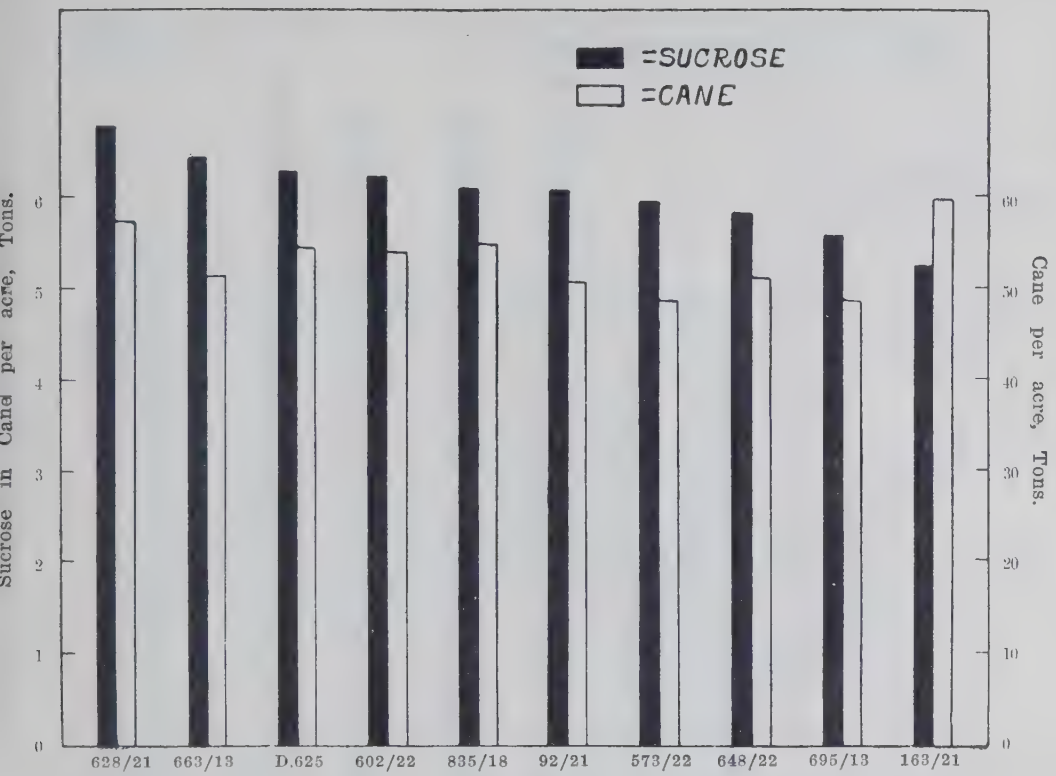

FIG. XXVI.

Total Yields of Sucrose and Cane, per acre, from Field 38 A., Lusignan (Plant Canes and First Ratoons).

The results of the first ratoon crop in Field 89 G.D., Diamond, are presented in Table XXXIV together with the combined results of both crops. The latter results are shown graphically in Figure XXVII.

TABLE XXXIV.

Location : DIAMOND, 89 G.D.

Age of Canes : 1ST RATOONS, 13.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results Plants and 1st Ratoons. Variety.	Combined Results Plants and 1st Ratoons. Sucrose in Cane per Acre, Tons.
	P.O.J. 2727	42.44	13.60	7.82	87.1	5.77	128.22	D. 927/22	11.40
Mean Yields :	D. 927/22	44.15	11.33	17.92	80.7	4.99	110.89	P.O.J. 2727	11.03
	D. 602/22	33.52	13.88	8.79	88.6	4.65	103.33	D. 602/22	10.90
	<> 10	29.52	15.56	4.51	91.5	4.58	101.78	<> 10	10.66
	S.C. 12 (4)	27.48	15.00	5.43	92.3	4.12	91.56	S.C. 12 (4)	9.39
	D. 557/20	21.48	13.46	6.96	89.1	2.90	64.44	D. 557/20	8.70
	Mean :					4.50	100.00		
	Standard Error :					0.22	4.89		
	Significant Difference, 20 : 1 :					0.67	14.89		

(*Plant cane results reported in Sugar Bull. I, pp. 21—24*).

In this trial P.O.J. 2727 has given a high yield of first ratoon cane and is significantly better than any of the other varieties in the trial. This cane did not stand out as a plant but the first ratoon yield is higher than that obtained in the plant cane crop. D. 927/22 which came first in the plant cane crop gave a good ratoon crop and is well ahead in the list of combined results. In both crops this cane gave a heavy tonnage and poor juice characteristics. D. 602/22 has done well in this trial and maintains its lead over Diamond 10 which was used as the standard in this experiment. S.C. 12/4 and D. 557/20 have given disappointing results. With the exception of D. 927/22 all the canes possessed desirable juice characteristics. Seedlings Diamond 5, D. 309/22, D. 663/13, D. 918/22, D. 118/02 and D. 613/21 were discarded from the ratoon experiment.

Inspection of the rainfall data shows that the rainfall was slightly below the average. A dry spell occurred during the first two months of growth while the month preceding reaping was marked by an excess of rainfall.

The soils of the experimental area have been previously described (*Sugar Bull.* I, p. 21), and the detailed results of their laboratory examination are presented in Appendix II.

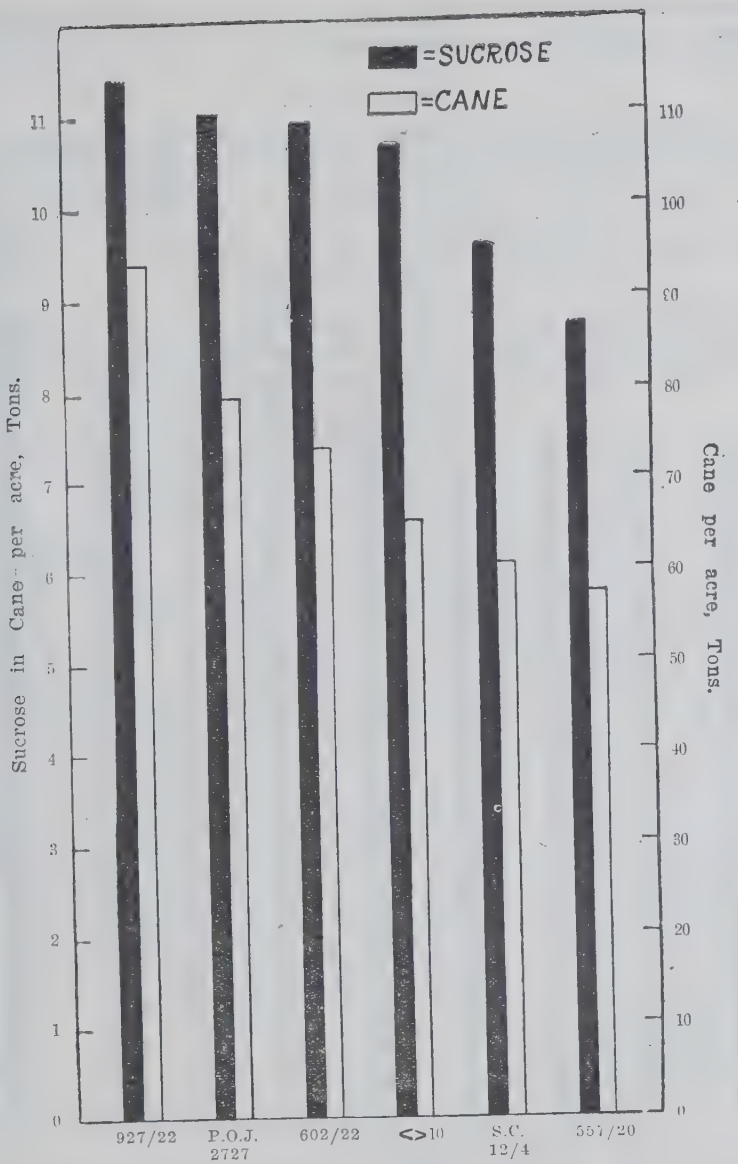

FIG. XXVII.

Total Yields of Sucrose and Cane, per acre, from Field 89 G.D., Diamond (Plant Canes and First Ratoons).

Details of the first ratoon variety trial reaped in West Demerara during the period under review are given in Table XXXV.

TABLE XXXV.

FIRST RATOON VARIETY TRIAL REAPED IN WEST DEMERARA.

Estate.	Field.	Age of cane, Months.	Date of Previous Reaping.	Date of Reaping.	Number of Varieties.	Number of Replicates.	Type of Layout.
Uitvlugt	10 Z.	12.00	7.IX.32	5.IX.33	9	7	Randomised Block.

The results of the first ratoon trial in Field 10 Z., Uitvlugt, are presented in Table XXXVI together with the combined results of the two crops. The latter results are also presented graphically in Figure XXVIII.

TABLE XXXVI.

Location : UITVLUGT, 10 Zeeburg.
Age of Canes : 1ST RATOONS, 12.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results Plants and 1st Ratoons. Variety.	Combined Results Plants and 1st Ratoons. Sucrose in Cane per Acre, Tons.
Mean Yields :	S.C. 12 (4)	30.41	11.58	6.11	86.2	3.52	112.10	D. 204/20	8.88
	D. 695/13	31.20	11.12	7.63	84.4	3.47	110.51	S.C. 12 (4)	8.35
	B.H. 10 (12)	27.63	12.08	6.30	86.8	3.33	106.05	D. 666/18	8.24
	D. 602/22	29.47	11.31	8.04	83.9	3.32	105.73	D. 173/21	8.19
	D. 666/18	33.95	9.27	10.56	73.6	3.15	100.32	D. 625	8.04
	D. 173/21	29.48	10.52	11.50	77.6	3.10	98.73	D. 602/22	7.93
	D. 204/20	28.57	10.37	10.38	79.9	2.96	94.27	D. 695/13	7.55
	D. 835/18	25.61	10.78	10.57	80.3	2.75	87.58	D. 835/18	7.52
	D. 625	26.94	9.95	7.94	75.8	2.68	85.35	B.H. 10 (12)	7.16
	Mean:					3.14	100.00		
	Standard Error:					...	...		
	Significant Difference, 20 : 1:					...	...		

(*Plant cane results reported in Sugar Bull. I, pp. 35—38*).

S.C. 12/4, which did not distinguish itself in the plant cane trial, came top in the first ratoon crop. It is closely followed by D. 695/13. Seedlings D. 204/20 and D. 625 which gave good plant cane crops, proved disappointing as ratoons. In the combined results D. 204/20 still heads the list while B.H. 10/12 shows poor returns. D. 571/20 was discarded as a first ratoon.

The rainfall data show that the trial experienced dry weather for the first three months of growth. During the remainder of the period the rainfall was normally distributed.

The soils of the experimental area have been previously described (*Sugar Bull.* I, p. 35). The detailed results of their laboratory examination appear in Appendix II.

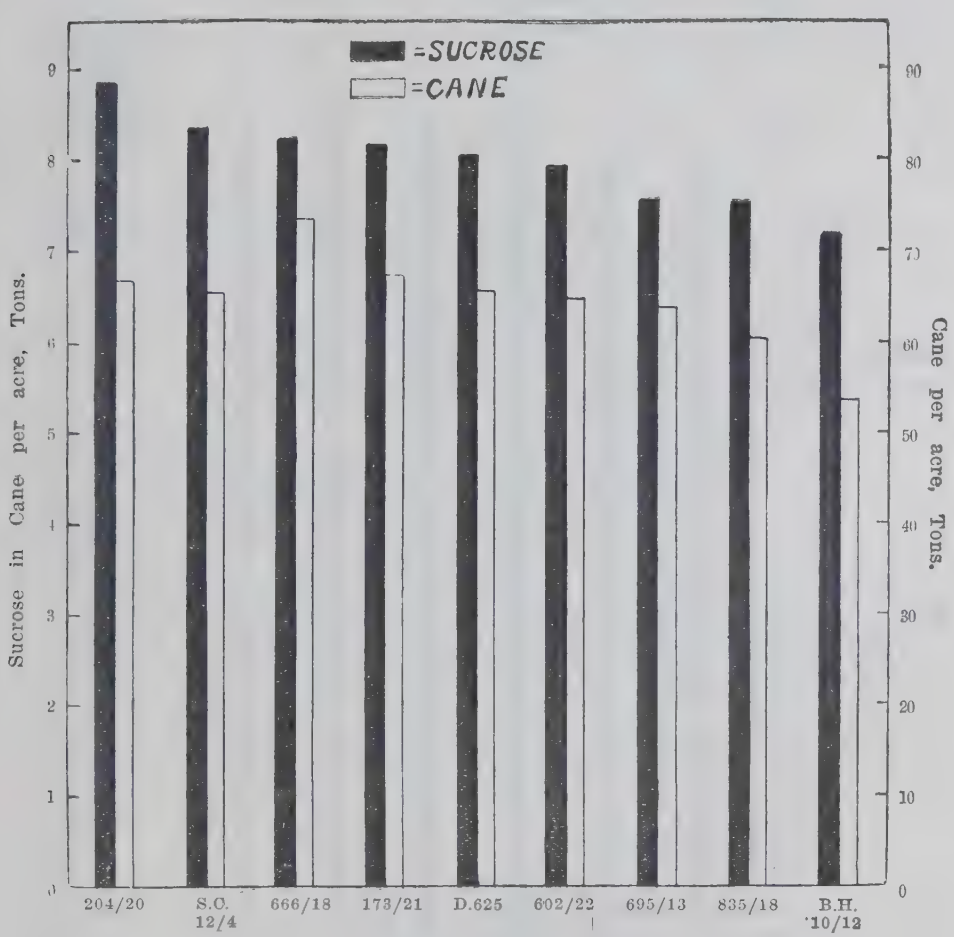

FIG. XXVIII.

Total Yields of Sucrose and Cane, per acre, from Field 10 Z., Uitvlugt (Plant Canes and First Ratoons).

SUB-SECTION C.—SECOND RATOON VARIETY TRIALS.

Details of the second ratoon variety trials reaped at Sophia Experiment Station during the period under review are given in Table XXXVII.

TABLE XXXVII.

SECOND RATOON VARIETY TRIALS REAPED AT SOPHIA EXPERIMENT STATION.

Field.	Age of cane, Months.	Date of Previous Reaping.	Date of Reaping.	Number of Varieties.	Number of Replicates.	Type of Layout.
8 East	11.00	24.IV.33	20.III.34	6	7	Randomised Block.
9 „	10.75	26.IV.33	19.III.34	6	7	Randomised Block.
10 „	12.50	2.III.33	16.III.34	7	5	Randomised Block.

The results of the second ratoon crop in Field 8 East, Sophia, are recorded in Table XXXVIII together with the combined results of the three crops. The latter results are also presented graphically in Figure XXIX.

TABLE XXXVIII.

Location : SOPHIA, 8 East.

Age of Canes : 2ND RATOONS, 11.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons	
								Variety.	Sucrose in Cane per Acre, Tons.
Mean Yields :	D. 351/20	15.48	12.93	6.36	89.0	2.01	104.69	D. 351/20	10.15
	D. 1034/21	16.61	12.02	8.39	8.66	1.99	103.65	D. 625	9.46
	D. 424/21	15.53	12.71	7.66	86.0	1.98	103.12	D. 1034/21	9.18
	D. 1034/22	16.71	11.70	9.56	85.1	1.94	101.04	D. 1034/22	9.04
	D. 625	14.77	12.93	11.56	84.6	1.91	99.48	D. 424/21	8.63
	D. 204/20	12.96	13.10	9.10	88.2	1.70	88.54	D. 204/20	8.54
	Mean :					1.92	100.00		
	Standard Error :					...	...		
	Significant Difference, 20 : 1 :					...	...		

(*Plant cane results reported in Sugar Bull. I, pp. 6, 12*).
(*First ratoon results reported in Sugar Bull. II, pp. 2, 3, 6, 7*).

D. 351/20 has headed the list in all three crops of this experiment. It has not, however, maintained this performance in other trials. D. 625 and D. 204/20 have given disappointing second ratoons. Seedlings D. 376/17, D. 238/17,

D. 789/18 and D. 75/20 gave a poor spring and were discarded from the final reaping. In the combined results D. 351/20 heads the list with the standard, D. 625, second.

Inspection of the rainfall data indicates that rain was normally distributed during the first six months of growth. Very heavy weather was experienced in

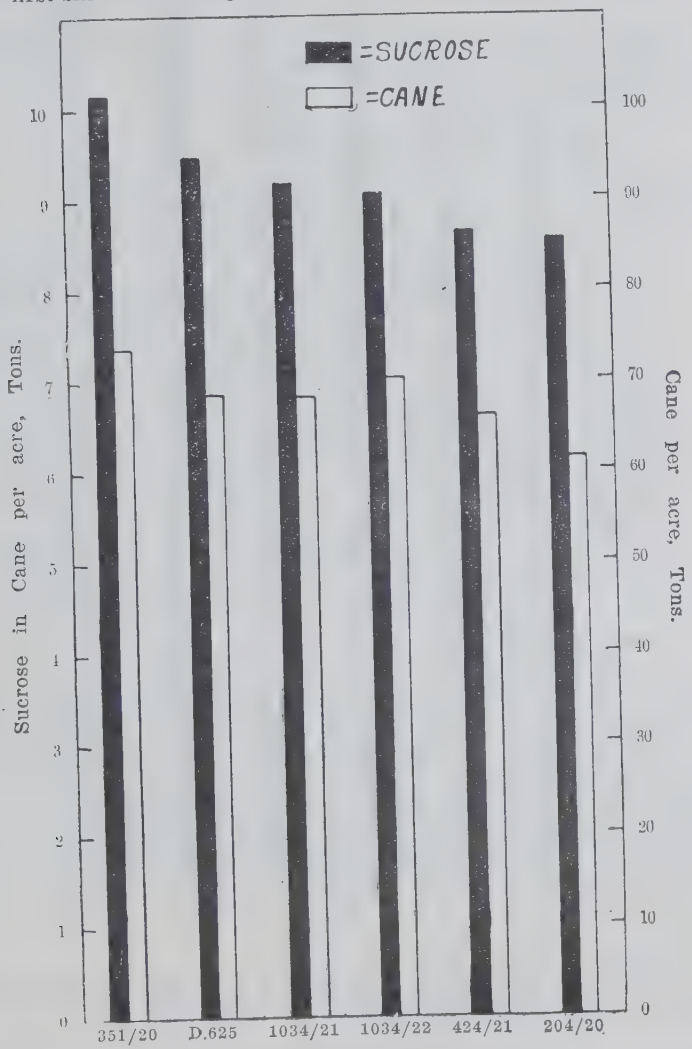

FIG. XXIX.

Total Yields of Sucrose and Cane, per acre, from Field 8 E., Sophia (Plant Canes, First and Second Ratoons).

December and January while fairly dry conditions obtained during the two months prior to reaping.

The soils of the experimental site have been already described (*Sugar Bull.* II, p. 3). The results of their laboratory examination are also included on that page.

The results of the second ratoon trial in Field 9 East, Sophia, are presented in Table XXXIX which also includes the combined results of the three crops. These latter results are shown graphically in Figure XXX.

TABLE XXXIX.

Location : SOPHIA, 9 East.
Age of Canes : 2ND RATOONS, 10.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons. Variety.	Sucrose in Cane per Acre, Tons.
Mean Yields :	D. 557/20	17.57	13.47	5.94	87.3	2.37	111.79	P.O.J. 2878	10.12
	D. 803,21	18.60	12.65	10.34	84.5	2.36	111.32	D. 557/20	9.62
	P.O.J. 2878	16.98	13.21	6.63	86.2	2.23	105.19	D. 573/22	9.55
	D. 625	14.84	13.27	10.78	84.1	1.97	92.92	D. 625	9.46
	D. 573/22	14.25	13.27	8.74	86.1	1.90	89.62	D. 893/21	9.00
	D. 663/13	14.53	12.87	6.91	86.9	1.88	88.68	D. 663/13	8.30
	Mean :					2.12	100.00		
	Standard Error :					0.13	6.13		
	Significant Difference. 20 : 1 :					0.39	18.40		

(*Plant cane results reported in Sugar Bull. I, pp. 6, 13*).
(*First ratoon results reported in Sugar Bull. II, pp. 2, 3, 8, 9*).

D. 557/20 gave a definitely better second ratoon yield than the standard. P. O. J. 2878 gave a somewhat disappointing yield in this crop. In the combined results P. O. J. 2878 heads the list and is followed by D. 557/20, D. 573/22 and D. 625. These three canes give very similar total yields. D. 744/21, D. 383/22, D. 699/20 and D. 571/20 gave a poor spring and were discarded from the experiment.

The growth period was identical with that of the previous experiment and the remarks there made regarding rainfall apply equally to this trial.

The soils of the experimental area have already been described in *Sugar Bulletin* II, p. 3, where the results of laboratory examination are also to be found.

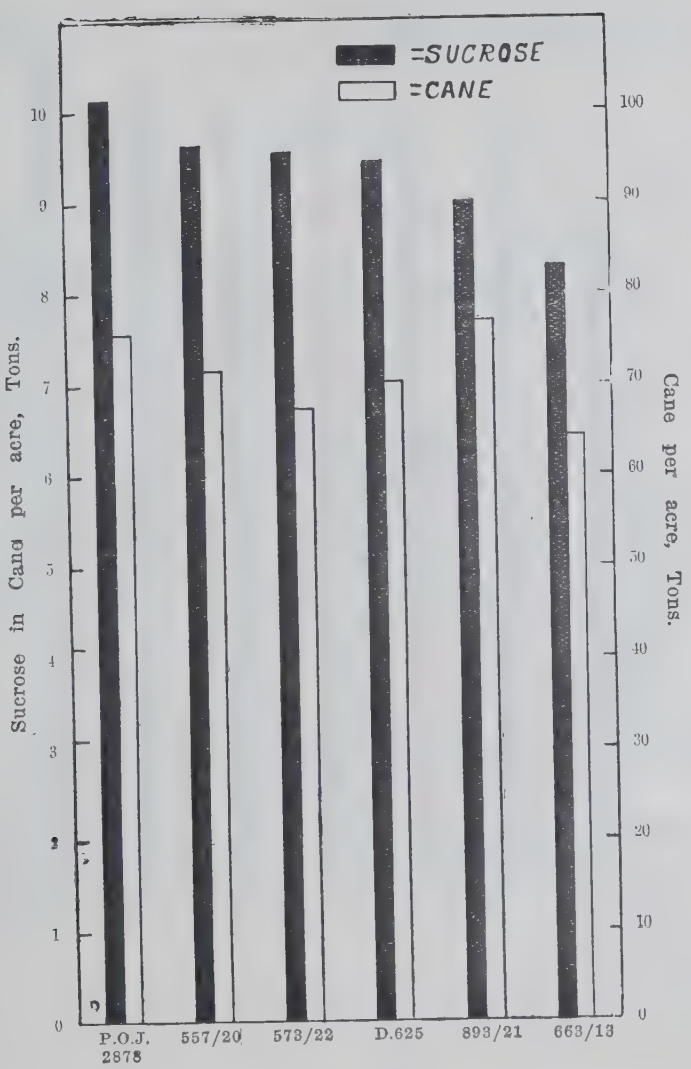

FIG. XXX.

Total Yields of Sucrose and Cane, per acre, from Field 9 E., Sophia (Plant Canes, First and Second Ratoons).

The results of the second ratoon crop in field 10 East, Sophia, are recorded in Table XL, together with the combined results of the three crops. The latter results are graphically presented in Figure XXXI.

TABLE XL.

Location : Sophia, 10 East.
Age of Canes : 2nd Ratoons, 12.50 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons. Variety.	Sucrose in Cane per Acre, Tons.
Mean Yields :	D. 203/20	8.89	12.65	7.63	86.9	1.13	116.49	D. 207/20	8.98
	D. 895/22	8.68	12.79	6.99	87.6	1.11	114.43	D. 203/20	8.88
	D. 602/22	8.43	12.99	7.53	86.9	1.09	112.37	D. 895/22	8.62
	D. 927/22	7.89	12.65	4.70	86.5	1.00	103.09	D. 625	8.61
	D. 625	6.84	14.26	8.18	87.6	0.98	101.03	D. 602/22	8.34
	D. 207/20	6.69	13.42	7.12	87.9	0.90	92.78	D. 927/22	8.31
	D. 6/21	5.18	12.05	11.87	82.0	0.62	63.92	D. 6/21	7.22
	Mean:					0.97	100.00		
	Standard Error:					0.05	5.15		
	Significant Difference, 20: 1:					0.17	17.53		

(*Plant cane results reported in Sugar Bull. I, pp. 16, 14*).
(*First ratoon results reported in Sugar Bull. II, pp 2, 3, 10, 11*).

The second ratoon crop of this experiment gave a very poor tonnage. In the combined results D. 207/20 comes top and is closely followed by D. 203/20. D. 895/22 and the standard are placed third and fourth. D. 6/21 gave disappointing returns. D. 73/20, D. 1175/22 and D. 918/22 gave a poor spring and were discarded from the experiment.

Inspection of the rainfall data in Appendix I indicates that the trial experienced normal rainfall during the first eight months. Excessive rain fell during November, December and January. Fairly dry weather preceded reaping.

The soils of the experimental area have been already described in *Sugar Bulletin* II, p. 3, where the results of their laboratory examination are reported.

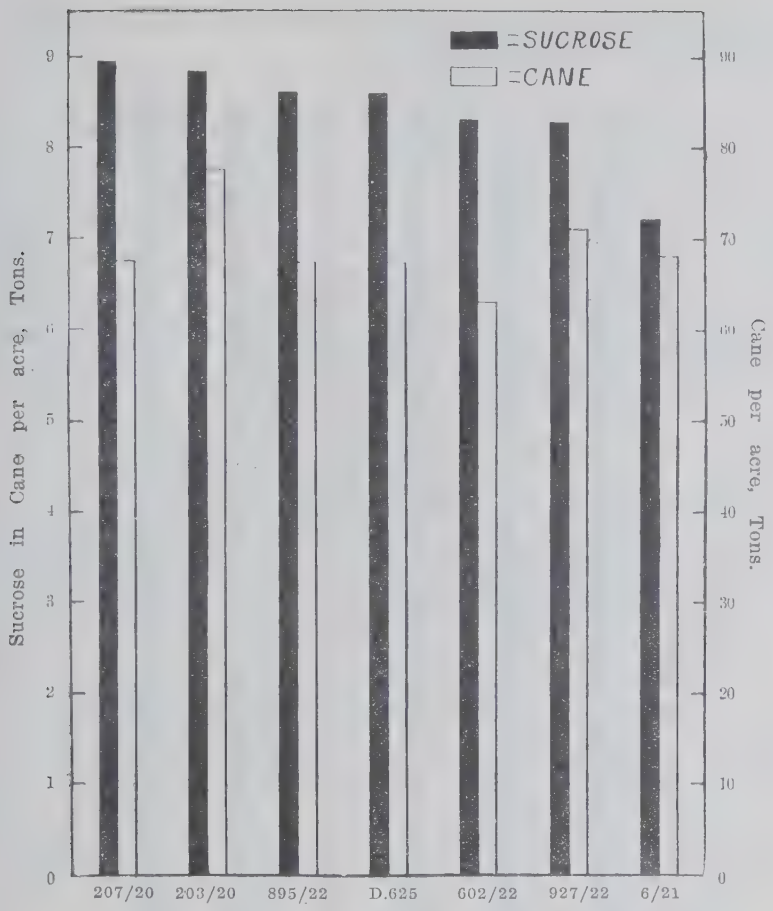

FIG. XXXI.

Total Yields of Sucrose and Cane, per acre, from Field 10 E., Sophia (Plant Canes, First and Second Ratoons).

Details of the second ratoon variety trials reaped in Berbice during the period under review are given in Table XLI.

TABLE XLI.

SECOND RATOON VARIETY TRIALS REAPED IN BERBICE.

Estate.	Field.	Age of cane, Months.	Date of Previous Reaping.	Date of Reaping.	Number of Varieties.	Number of Replicates.	Type of Layout.
Port Mourant	6 R.	12.75	14.IX.32	5.X.33	6	5	Randomised Block.
Blairmont	11 R.	12.00	4.XI.32	4.XI.33	9	5	Randomised Block.

The results of the second ratoon crop in Field 6 R., Port Mourant, are recorded in Table XLII together with the combined yields for the three crops. These latter yields are graphically presented in Figure XXXII.

TABLE XLII.

Location : PORT MOURANT, 6 Resource.
Age of Canes : 2ND RATOONS, 12.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons. Variety.	Sucrose in Cane per Acre, Tons.
Mean Yields :	D. 666/18	36.02	12.26	7.71	83.9	4.50	107.66	D. 835/18	14.48
	D. 835/18	33.74	13.33	6.49	86.9	4.48	107.18	D. 625	14.42
	S.C. 12 (4)	31.75	13.32	4.01	89.4	4.24	101.44	D. 666/18	14.28
	B.H. 10 (12)	31.25	13.12	4.53	88.3	4.09	97.85	B.H. 10 (12)	14.26
	D. 73/20	31.38	12.71	5.67	86.6	3.99	95.45	D. 73/20	13.92
	D. 625	28.71	13.31	7.75	85.0	3.79	90.67	S.C. 12 (4)	13.56
	Mean:					4.18	100.00		
	Standard Error:					...	...		
	Significant Difference, 20: 1:					...	...		

(*Plant cane results reported in Agr. Jour. B. G., IV, 4, p. 202*).

(*First ratoon results reported in Sugar Bull. I, pp. 30-33*).

D. 666/18, which did not do particularly well as a plant and first ratoon, heads the list as a second ratoon due to heavier tonnage of cane. The standard, D. 625, excelled in the plant cane crop, but was disappointing as a ratoon.

In the combined results D. 835/18 comes first and is closely followed by D. 625. D. 666/18 and B.H. 10/12 give slightly lower yields. S.C. 12/4 is disappointing, due to a poor plant cane yield.

Inspection of the rainfall data of Appendix I shows that the cane experienced a dry spell during the three months following reaping. From then on the

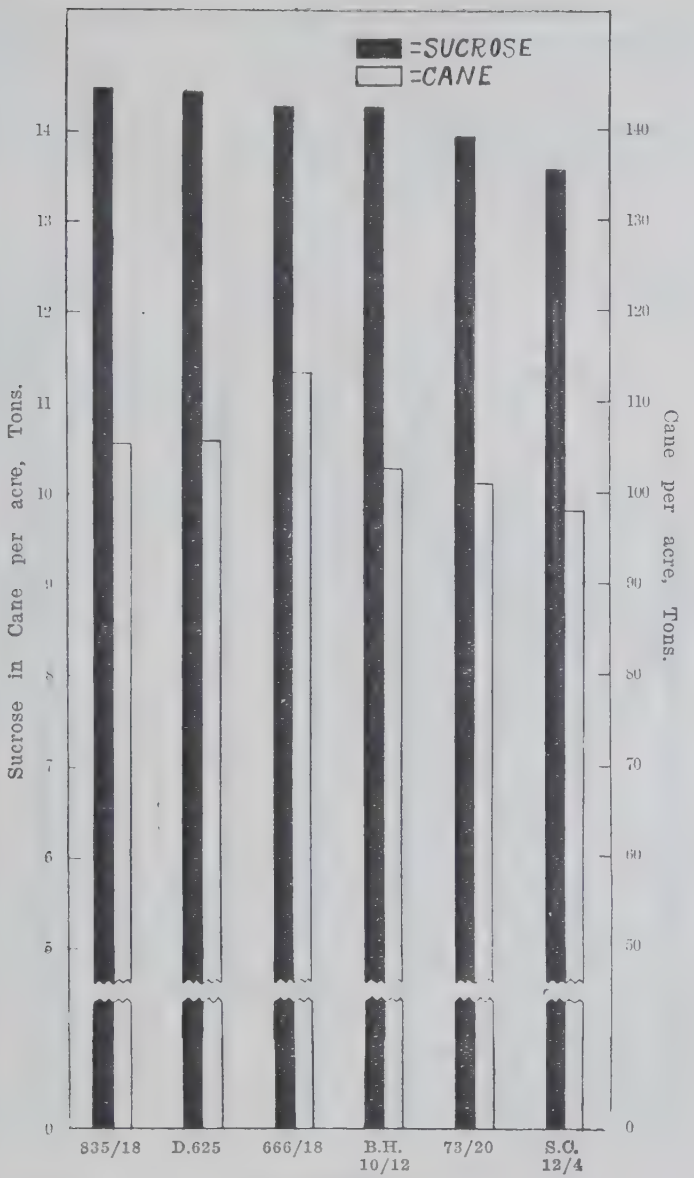

FIG. XXXII.

Total Yields of Sucrose and Cane, per acre, from Field 6 R., Port Mourant (Plant Canes, First and Second Ratoons).

experiment received normally distributed rain. The precipitation was in slight excess during the two months preceding reaping.

The soils of the experimental area are described in *Sugar Bulletin* I, p. 31. The detailed results of their laboratory examination are recorded in Appendix II.

The results of the second ratoon trial in Field 11 R., Blairmont, are presented in Table XLIII together with the combined yields for the three crops. These latter yields are graphically presented in Figure XXXIII.

TABLE XLIII.

Location : BLAIRMONT, 11 River Side.
Age of Canes : 2ND RATOONS, 12.00 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons. Variety.	Sucrose in Cane per Acre, Tons.
Mean Yields :	<> 10	33.15	14.78	6.20	87.2	4.91	133.42	<> 10	17.84
	D. 814/12	30.43	13.23	7.76	84.5	4.01	108.97	D. 835/18	15.96
	D. 663/13	31.04	12.41	10.24	84.2	3.84	104.35	D. 625	15.78
	D. 625	30.08	12.64	12.81	82.6	3.81	103.53	D. 663/13	14.96
	D. 835/18	28.14	12.85	9.47	85.1	3.64	98.91	D. 814/12	14.90
	B.H. 10 (12)	23.62	14.56	4.95	89.0	3.43	93.21	D. 666/18	14.00
	S.C. 12 (4)	25.28	12.87	7.14	86.6	3.24	88.04	D. 684/21	13.79
	D. 684/21	28.95	11.14	23.35	75.3	3.22	87.50	B.H. 10 (12)	13.71
	D. 666/18	24.08	12.53	12.85	81.7	3.01	81.79	S.C. 12 (4)	13.55
	Mean :					3.68	100.00		
	Standard Error :					0.21	5.71		
	Significant Difference, 20 : 1 :					0.69	18.75		

(*Plant cane results reported in Agr. Jour. B. G., IV, p. 201*).
(*First ratoon results reported in Sugar Bull. I, pp. 16-19*).

The seedlings in this trial gave good second ratoon yields, Diamond 10 and B.H. 10/12 being particularly sweet canes. Diamond 10 gave a definitely better second ratoon yield than any of the other seedlings in the trial. Its yield is nearly one ton sucrose per acre better than its nearest rival. D. 625 gave a fair ratoon yield but D. 666/18 has been disappointing in this trial. Bourbon failed to spring well and was discarded from the second ratoon experiment. In the combined results Diamond 10 is almost two tons of sucrose per acre better than its nearest rival D. 835/18. Seedlings D. 684/21, B. H. 10/12 and S. C. 12/4 have proved disappointing in this experiment.

Inspection of the rainfall data recorded in Appendix I indicates that rain was very deficient during the first month of the growth period. The rains in May, June and August were slightly excessive, otherwise the rainfall was normally distributed.

The soils of the experimental site have already been described (*Sugar Bulletin* I, pp. 17-18). The detailed results of their laboratory examination are included in Appendix II.

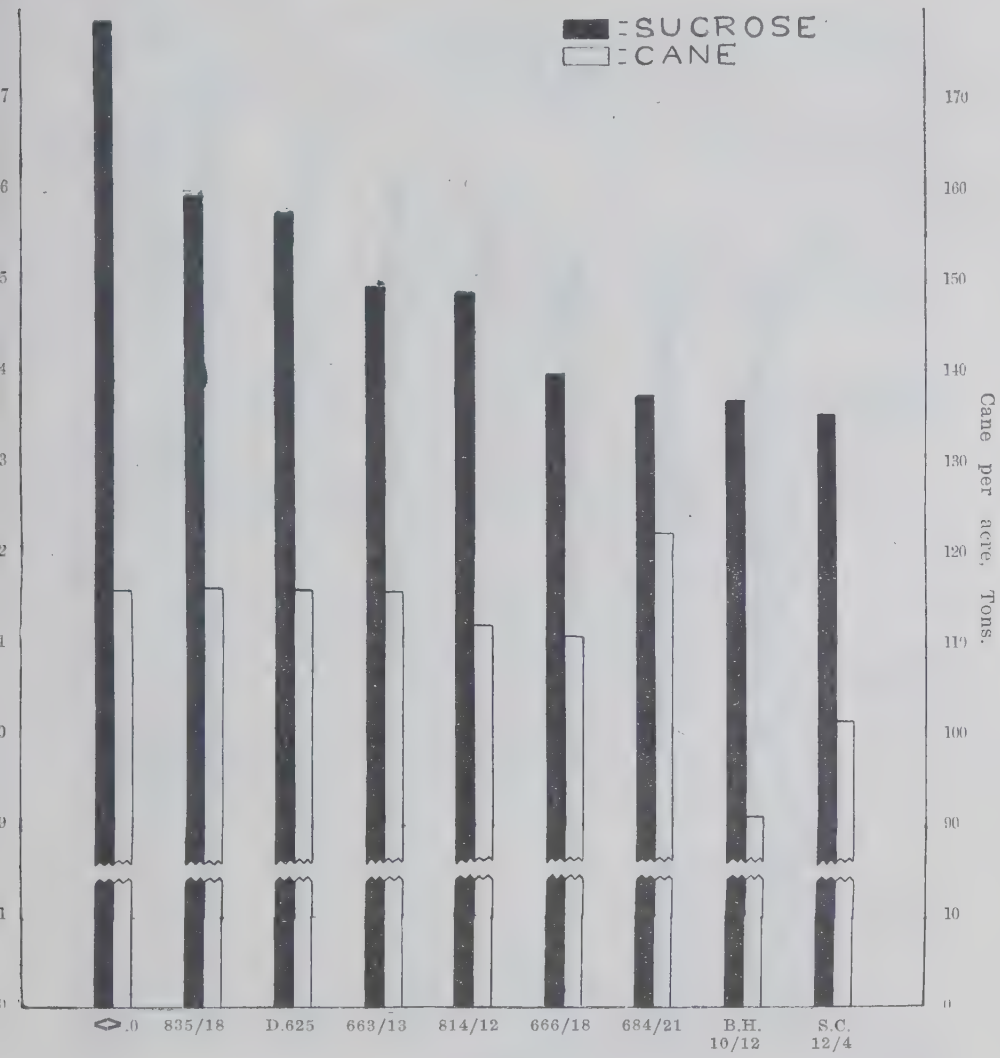

FIG. XXXIII.

Total Yields of Sucrose and Cane, per acre, from Field 11 R., Blairmont (Plant Canes, First and Second Ratoons).

Details of the second ratoon variety trials reaped in East Demerara during the period under review are given in Table XLIV.

TABLE XLIV.

SECOND RATOON VARIETY TRIALS REAPED IN EAST DEMERARA.

Estate.	Field.	Age of cane, months.	Date of Previous Reaping.	Date of Reaping	Number of Varieties.	Number of Replicates.	Type of Layout.
Lusignan	19 E.	12.25	5.X.32	13.X.33	7	5	Randomised Block.
Diamond	53 G. D.	12.75	28.IX.32	19.X.33	8	6	Randomised Block.

The results of the second ratoon variety trial in Field 19 E. Lusignan, are recorded in Table XLV together with the combined yields for the three crops. The latter results are presented graphically in Figure XXXIV.

TABLE XLV.

Location : LUSIGNAN, 19 East.
Age of Canes : 2ND RATOONS, 12.25 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons. Variety.	Sucrose in Cane per Acre, Tons.
Mean Yields :	D. 666/18	28.31	10.52	18.35	77.7	2.97	122.22	D. 666/18	10.73
	S.C. 12 (4)	22.67	12.68	7.37	85.7	2.93	120.58	D. 351/20	9.88
	D. 447/17	16.77	14.48	7.19	87.7	2.43	100.00	D. 447/17	9.46
	D. 31/17	18.68	12.58	10.39	83.7	2.34	96.30	S.C. 12 (4)	9.16
	B.H. 10 (12)	16.33	13.93	6.13	87.6	2.28	93.83	D. 31/17	8.59
	D. 625	18.78	11.63	13.26	79.7	2.19	90.12	B.H. 10 (12)	8.46
	D. 351/20	15.91	12.17	8.63	83.8	1.93	79.42	D. 625	8.21
	Mean:					2.43	100.00		
	Standard Error:					0.21	8.64		
	Significant Difference, 20: 1:					0.68	27.98		

(*Plant cane results reported in Agr. Jour. B. G., IV, 4, p. 202*).

(*First ratoon results reported in Sugar Bull. I, pp. 25-27*).

D. 666/18, which did fairly well in the plant cane crop, headed the list both in the first and in the second ratoons. It gave in the final crop poor juice characteristics. D. 447/17, which has appeared only in this trial, is a very sweet cane. D. 351/20, which did well in the first two crops, was very disappointing as a second ratoon. In the combined results D. 666/18 easily leads D. 351/20. D. 625, the standard, gave a poor performance in this trial.

Inspection of the rainfall data in Appendix I indicates that a dry spell occurred during the first two months of the period. During May, June and August the rainfall was in slight excess. For the remainder of the period the precipitation was normal.

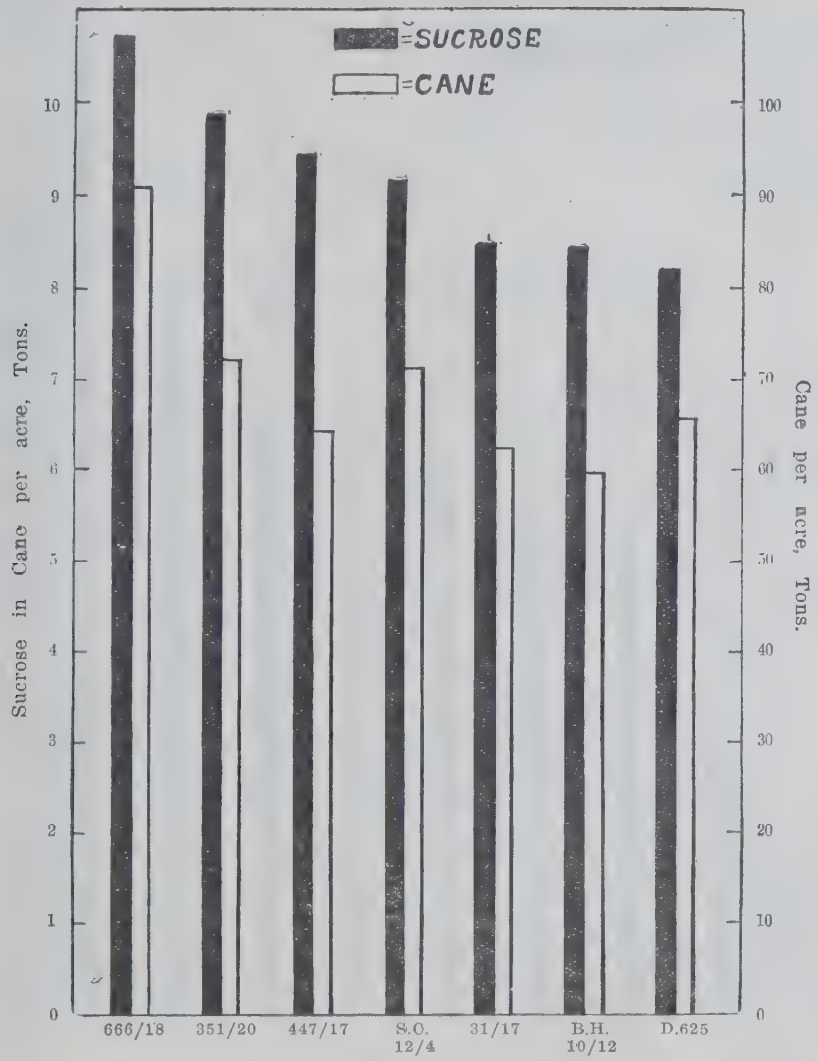

FIG. XXXIV.

Total Yields of Sucrose and Cane, per acre, from Field 19 E., Lusignan (Plant Canes, First and Second Ratoons).

The soils of the experimental area have already been described (*Sugar Bull.* I, pp. 25-26). The detailed results of their laboratory examination are recorded in Appendix II.

The results of the second ratoon crop in Field 53 G.D., Diamond, are presented in Table XLVI together with the combined results for the three crops. The latter are also shown graphically in Figure XXXV.

TABLE XLVI.

Location : DIAMOND, 53 G.D.
Age of Canes : 2ND RATOONS, 12.75 months.

	Variety.	Cane per Acre, Tons.	Sucrose in Cane, %.	Glucose Ratio.	Purity.	Sucrose in Cane per Acre, Tons.	Sucrose in Cane per Acre, % Mean.	Combined Results for 3 Crops, Plants, 1st and 2nd Ratoons. Variety.	Sucrose in Cane per Acre, Tons.
Mean Yields :	<> 10	24.25	14.60	7.44	87.3	3.54	176.12	<> 10	13.41
	S.C. 12 (4)	17.07	13.93	8.41	89.3	2.38	118.41	S.C. 12 (4)	10.61
	D. 557/20	16.27	12.92	10.19	87.0	2.10	104.48	D. 557/20	9.42
	D. 666/18	17.79	10.54	23.33	76.5	1.87	93.03	<> 17	9.35
	<> 17	15.95	11.58	18.21	79.5	1.83	91.04	D. 625	8.83
	D. 628/20	12.09	13.17	11.95	84.9	1.54	76.62	D. 666/18	8.38
	D. 835/18	12.68	11.14	18.22	80.7	1.44	71.64	D. 628/20	8.06
	D. 625	11.89	11.30	24.60	77.2	1.36	67.66	D. 835/18	7.20
	Mean:					2.01	100.00		
	Standard Error:					0.22	10.95		
	Significant Difference, 20: 1:					0.71	35.32		

(*Plant cane results reported in Agr. Jour. B.G., IV, 4, p. 202*).

(*First ratoon results reported in Sugar Bull. I, pp. 21-23*).

In this trial the seedling Diamond 10 has given a fine performance as a second ratoon and exceeds its nearest rival in yield, S.C. 12/4, by over one ton of sucrose per acre. D. 625 has given a very poor second ratoon crop and was apparently not ripe when reaped. In the combined results Diamond 10 has every other seedling well beaten, giving nearly three tons of sucrose per acre more than S.C. 12/4, the second on the list. The results of this trial and those obtained in Field R. 11, Blairmont, demonstrate the superior ratooning powers of Diamond 10.

Inspection of the rainfall data, presented in Appendix I, indicates that the first two months of the growth period were marked by dry weather. During the remainder of the period the rainfall was normally distributed.

The soils of the experimental area have already been described (*Sugar Bull.* I, p. 21). The detailed results of their laboratory examination are recorded in Appendix II.

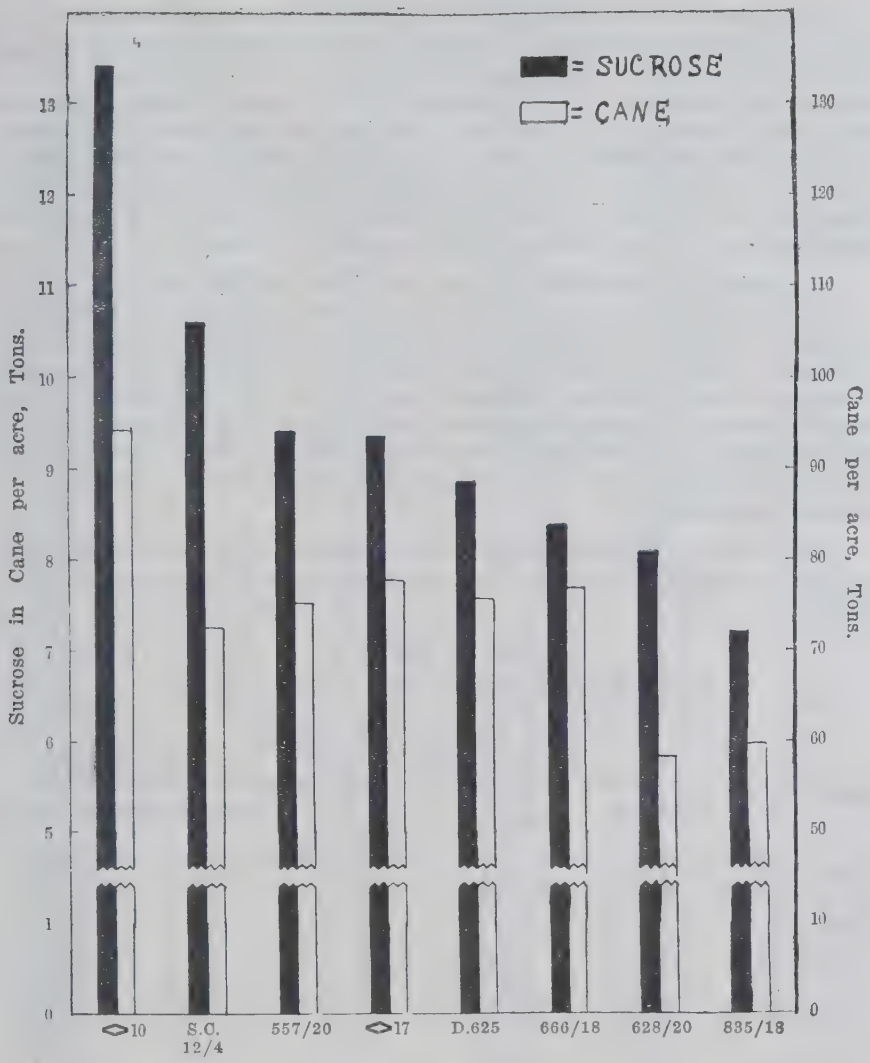

FIG. XXXV.

Total Yields of Sucrose and Cane, per acre, from Field 53 G.D., Diamond (Plant Canes, First and Second Ratoons).

SUB-SECTION D.—DISCUSSION AND SUMMARY OF RESULTS.

Discussion of Results.

At the time of the reorganization of sugar-cane experimental work at Sophia, it was found that a large number of imperfectly tested seedlings had accumulated at the Station. These seedlings had not been subjected to serious field trial and since many of them were of promising appearance it seemed unwise to eliminate them without some evidence of their behaviour on the estates of the Colony. During the past four years 113 seedlings have been carefully compared with the standard cane, D. 625, on various plantations, and the information which has accumulated has led, not only to the elimination of the majority of these seedlings, but also to an appreciation of the few promising varieties in the collection.

In previous Bulletins the seedlings have been classified according to their mean yield of sucrose per acre. This method has proved somewhat confusing since some seedlings have been tested only under circumstances conducive to high yields, while, on the other hand, certain seedlings have had the misfortune of being tried only under less favourable growth conditions. In order to obviate these difficulties the sucrose yield of each seedling has been compared, in each trial, with that of the standard cane, D. 625, taken as 100.0. The percentage values for each seedling have been averaged and form the basis of the tables presented in this sub-section.

Thirty-three of the seedlings have been compared with the standard in plant cane, first ratoon and second ratoon crops and the results are summarised in Table XLVII.

Table XLVII.

Mean Sucrose Yields from Three Crops.

Variety.	Mean Sucrose, Tons per acre (Corrected values),[1]				Total yield,
	Plants.	First Ratoons.	Second Ratoons.	Total.	D. 625=100.0.
Diamond 10	**5.55**	**4.12**	4.81	14.48	130.4
P.O.J. 2878	**5.71**	4.41	2.80	12.92	116.4
D. 447/17	6.10	3.97	2.74	12.81	115.4
Diamond 17	4.90	3.78	3.32	12.00	108.1
D. 927/22	5.27	4.03	2.52	11.82	106.5
D. 666/18	**4.86**	**3.91**	**2.91**	**11.68**	**105.2**
D. 31/17	5.28	3.55	2.64	11.47	103.3
P.O.J. 2727	4.63	**4.14**	2.56	11.33	102.1
D. 207/20	4.95	3.95	2.27	11.17	100.6
D. 625	**4.92**	**3.71**	**2.47**	**11.10**	**100.0**
D. 203/20	4.21	3.88	2.85	10.94	98.6

TABLE XLVII—(*Continued.*)
MEAN SUCROSE YIELDS FROM THREE CROPS.

Variety.	Mean Sucrose, Tons per acre (Corrected values),[1]				Total yield,
	Plants.	First Ratoons.	Second Ratoons.	Total.	D. 625=100.0.
D. 1034/22	5.11	3.32	2.51	10.94	98.6
D. 895/22	**4.63**	3.50	2.80	10.93	98.5
D. 573/22	**5.00**	3.55	2.38	10.93	98.5
D. 557/20	**4.46**	**3.33**	**2.99**	**10.78**	**97.1**
D. 1034/21	4.70	3.51	2.57	10.78	97.1
D. 893/21	4.08	3.67	2.96	10.71	96.5
D. 602/22	**4.50**	**3.44**	2.75	10.69	96.3
D. 424/21	**4.60**	**3.53**	2.56	10.69	96.3
S.C. 12 (4)	**4.13**	**3.58**	**2.93**	**10.64**	**95.9**
D. 204/20	**5.00**	3.34	2.20	10.54	95.0
D. 351/20	**5.12**	**3.42**	**1.95**	**10.49**	**94.5**
D. 835/18	**4.51**	**3.44**	**2.48**	**10.43**	**94.0**
D. 695/13	**4.31**	**3.68**	2.34	10.33	93.1
D. 628/20	3.85	3.60	2.80	10.25	92.3
D. 663/13	**4.46**	**3.32**	2.42	10.20	91.9
P.O.J. 2725	4.33	3.56	2.29	10.18	91.7
D. 814/12	**4.28**	3.13	2.60	10.01	90.2
D. 684/21	4.70	3.18	2.09	9.97	89.8
D. 6/21	**4.62**	3.20	1.56	9.38	84.5
B.H. 10(12)	**3.85**	**3.32**	**2.17**	**9.34**	**84.1**
D. 73/20	**4.01**	**3.36**	1.92	9.29	83.7
D. 689/13	**3.87**	**2.44**	1.73	8.04	72.4
Bourbon	3.15	3.06	1.23	7.44	67.0

The figures in block type indicate mean values obtained from the results of three or more experiments.

Diamond 10 appears at the top of the list. Its marked superiority to the other seedlings is due to unusually heavy yields in the two second ratoon trials which have so far been reaped. Six further trials with Diamond 10 second ratoons will be harvested during the coming year and the results will be awaited with interest. This seedling has many desirable characteristics. While it does not give such a heavy tonnage of cane as many of the other seedlings under test, yet its comparatively high sucrose content renders it one of the most efficient

NOTE :—[1]The corrected figures in this and other tables have been obtained by calculating the mean yield of each seedling in each crop as a percentage of the yield of D. 625 in the same experiment. The actual mean yields of D. 625 in all experiments have then been multiplied by these mean percentage figures in order to obtain the corrected values.

sugar producers under trial. It has always been the aim of cane breeders to produce seedlings of high sucrose content so that less cane need be ground to manufacture as much or more sugar. The authorities of Pln. Diamond, who are responsible for the production of Diamond 10, deserve congratulations in this respect.

P.O.J. 2878 comes second on the list, and in yield of sucrose is well below Diamond 10. Its ratooning capabilities have, so far, been imperfectly tested and the results here reported depend on two first ratoon crops and one second ratoon crop. This seedling, when compared with D. 625, gives a heavier tonnage of cane, contains more sucrose, has a slightly higher juice purity and ripens better under British Guiana conditions. It is a question whether the ordinary planting methods of this Colony when applied to P.O.J. 2878 do not produce overcrowding. Experiments with different spacings and different amounts of planting material per row should prove of interest. It is realised in Java that P.O.J. 2878 requires a long growth period. While the evidence so far obtained in this Colony is insufficient as a basis of a definite statement, yet there are indications that P.O.J. 2878 gives heavier yields when the growth period exceeds the average. One or two complaints have been made concerning the suitability of P.O.J. 2878 bagasse as fuel. There is, as far as we know, no record of such trouble with this cane in other countries, and in Java, where it has comprised more than 90 per cent. of the total plantings, it has formed practically the sole supply of fuel.

Seedlings D. 447/17 and Diamond 17, which come third and fourth on the list, have only appeared in one field trial. On their present performance they deserve further testing. D. 447/17 appears to resemble Diamond 10 in possessing a high sucrose content and a desirable juice purity.

Seedling D. 927/22, which is fifth in order of sucrose yield, has appeared in only two trials. It has definitely outyielded Diamond 10 in Field G.D. 89, Diamond, but has not shown itself superior to D. 625 in Field 10 East, Sophia. Solely from the point of view of yield this variety deserves more extended trial. It tends however to produce a heavy yield of cane which contains less than the average amount of sucrose. It may, therefore, prove more useful in breeding work than as a commercial variety.

D. 666/18, a seedling which has been known to the planters of this Colony for some time, appears sixth on the list. It has appeared in a considerable number of field trials and its capabilities are fairly well known. It usually gives a slightly smaller plant cane crop than the standard, D. 625, but produces heavier yields in the first and second ratoon crops. D. 666/18 tends to produce a heavy tonnage of cane of inferior sucrose content.

D. 31/17, which comes seventh on the list, has appeared only in one field trial. It appears to be a sweet cane and deserves further field trial.

P.O.J. 2727, the eighth seedling on the list, seems to produce a comparatively inferior plant cane yield but possesses good ratooning qualities. It is not a particularly sweet cane and owes its position to its capacity to produce heavy tonnages.

D. 207/20, the ninth seedling on the list, has not appeared in many field trials. It is similar to the standard cane in its juice characteristics.

The standard cane, D. 625, appears tenth on the list. In thirty-eight plant cane trials, it has given an average yield of 4.92 tons of sucrose per acre, in twenty-three first ratoon trials its average yield has been 3.71 tons of sucrose per acre, while in eight second ratoon trials it has given a mean yield of 2.47 tons of sucrose per acre. The first ratoon yields are 75.3 per cent. of the plant cane yields, while the second ratoon yields are 50.2 per cent. of the plant cane yields. Inspection of the figures presented in Table XLVII shows that, of the thirty-three seedlings compared with D. 625, ten of them gave superior plant cane yields, nine of them outyielded the standard in the first ratoon crop, while twenty of them gave heavier second ratoon yields than the standard. It seems, therefore, that while D. 625 gives good crops of plant and first ratoon cane its vigour as a second ratoon is below the average.

Other canes which have been well tested but have failed to outyield the standard are D. 557/20, D. 602/22, S.C. 12(4), D. 351/20, D. 835/18 and B.H. 10(12).

S.C. 12(4) appears to be better suited to the conditions of British Guiana than is B.H. 10(12). The former produces a heavy second ratoon crop, the latter does not distinguish itself in this manner.

Forty seedlings have been compared with the standard cane in plant cane and first ratoon crops only. The results are presented in Table XLVIII where values for P.O.J 2878, Diamond 10 and D. 625 are included for comparison.

TABLE XLVIII.

MEAN SUCROSE YIELDS FROM PLANT CANES AND FIRST RATOONS.

Variety.	Mean Sucrose, Tons per acre (Corrected values),			Total yield,
	Plants.	First Ratoons.	Total.	D. 625=100.0.
P.O.J. 2878	**5.71**	**4.41**	**10.12**	**117.3**
Diamond 10	**5.55**	**4.12**	**9.67**	**112.1**
D. 628/21	5.15	4.27	9.42	109.2
D. 173/21	4.67	4.29	8.96	103.8
D. 52/20	5.54	3.31	8.85	102.5
D. 241/21	5.22	3.48	8.70	100.8
D. 625	**4.92**	**3.71**	**8.63**	**100.0**
S.W. 3	5.16	3.46	8.62	99.9

TABLE XLVIII—(*Continued.*)

MEAN SUCROSE YIELDS FROM PLANT CANES AND FIRST RATOONS.

Variety.	Mean Sucrose, Tons per acre (Corrrected values),			Total yield, D. 625=100.0.
	Plants.	First Ratoons.	Total.	
D. 92/21	4.45	4.03	8.48	98.3
D. 1431/22	5.03	3.39	8.42	97.6
D. 92/17	5.11	3.17	8.28	95.9
D. 744/21	4.85	3.35	8.20	95.0
D. 648/22	4.28	3.86	8.14	94.3
D. 71/20	4.80	3.06	7.86	91.1
D. 593/22	4.89	2.81	7.70	89.2
D. 604/20	4.60	3.06	7.66	88.8
D. 383/22	4.15	3.44	7.59	87.9
D. 53/27	4.83	2.75	7.58	87.8
P.O.J. 1499	4.25	3.25	7.50	86.9
D. 376/17	4.68	2.79	7.47	86.6
D. 794/18	4.23	3.21	7.44	86.2
D. 1175/22	4.01	3.42	7.43	86.1
D. 238/17	4.23	3.17	7.40	85.7
P.O.J. 2714	4.33	2.95	7.28	84.4
D. 661/21	4.43	2.82	7.25	84.0
D. 679/20	3.52	3.69	7.21	83.5
D. 309/22	4.62	2.56	7.18	83.2
D. 789/18	4.25	2.79	7.04	81.6
D. 403/18	4.21	2.78	6.99	81.0
P.O.J. 213	3.89	3.09	6.98	80.9
D. 611/18	4.20	2.77	6.97	80.8
D. 163/21	4.45	2.52	6.97	80.8
D. 1221/22	4.11	2.72	6.83	79.1
Diamond 5	4.95	1.85	6.80	78.8
D. 75/20	4.06	2.73	6.79	78.7
D. 699/20	**4.16**	**2.44**	**6.60**	**76.5**
D. 918/22	3.71	2.11	5.82	67.4
D. 118/02	3.96	1.85	5.81	67.3
D. 571/20	**3.56**	**2.03**	**5.59**	**64.8**
B. 74	3.72	1.85	5.57	64.5
D. 613/21	3.69	1.85	5.54	64.2
I.C.T.A. 36	3.55	1.85	5.40	62.6
D. 620/21	3.29	1.85	5.14	59.6

The varieties P.O.J 2878 and Diamond 10, which appear at the head of the list, have already been discussed.

D. 628/21, the third seedling on the list, has not been thoroughly tried and owes its present position to a heavy yield obtained in one first ratoon trial. Its juice characteristics appear to be similar to those of the standard. It deserves, on its present performance, further trial.

D. 173/21, the fourth on the list, has only appeared in one field trial. While its yield as a plant cane was slightly below that of the standard, yet it produced a very good first ratoon crop. Its juice qualities are undistinguished. In view of its ratooning capabilities this seedling deserves further trial.

D. 52/20, the fifth seedling on the list, has only appeared in one field trial. It gave a fairly heavy plant cane crop but produced a poor first ratoon. Its juice characteristics are slightly superior to the standard. This seedling hardly deserves further trial until the results of the second ratoon crop have been obtained.

D. 241/21, the sixth seedling on the list, has appeared in two plant cane and two first ratoon trials. In a plant cane trial at Pln. Port Mourant, this variety gave an exceptionally heavy yield but did not duplicate this performance in the other plant cane trial at Lusignan. This seedling gives slightly heavier tonnages than the standard cane but its juice characteristics are similar to D. 625. From the information at present available, it appears that D. 241/21 lacks ratooning power.

The standard cane, D. 625, comes seventh on the list and has appeared in thirty-eight plant cane and twenty-three first ratoon trials. Its average yield for the two crops is 8.63 tons of sucrose per acre.

Other seedlings which have not surpassed D. 625 in yield but possess interesting characteristics are S.W.3, a sweet cane, D. 92/27 and D. 648/22 which appear to possess good ratooning powers, the latter being a sweet cane.

Forty seedlings have been compared with D. 625 in plant cane trials only. The results are presented in Table XLIX where figures for P.O.J. 2878, Diamond 10 and D. 625 are included for comparison.

TABLE XLIX.

MEAN SUCROSE YIELDS FROM PLANT CANES.

Variety.	Mean Sucrose, Tons per acre (Corrected Values). Plants.	Yield, D. 625=100.0
D. 747/13	6.35	129.1
P.O.J 2878	**5.71**	**116.1**
D. 309/21	5.68	115.4
Diamond 10	**5.55**	**112.8**
Co. 213	5.45	110.8
D. 11/28	**5.33**	**108.3**
Co. 210	5.24	106.5
D.195/17	5.10	103.7
D. 857/21	5.04	102.4
D. 11/24	4.97	101.0
Berbice	4.96	100.8
D. 1/28	4.94	100.4
D. 625	**4.92**	**100.0**
D. 444/21	4.91	99.8
P.O.J. 253	4.86	98.8
Co. 281	4.81	97.8
D. 548/21	4.81	97.8
D. 9/28	**4.73**	**96.1**
D. 154/28	4.71	95.7
D. 404/17	4.64	94.3
D. 880/21	4.64	94.3
D. 50/28	4.64	94.3
D. 682/20	4.59	93.3
D. 4/28	**4.49**	**91.3**
D. 20/28	4.45	90.4
D. 1159/22	4.35	88.4
D. 438/21	4.34	88.2
D. 23/28	**4.26**	**86.6**
G. 119	**4.24**	**86.2**
D. 13/28	**4.21**	**85.6**
D. 206/21	4.15	84.3
D. 73/17	4.07	82.7
D. 349/20	4.06	82.5
D. 3/28	**4.02**	**81.7**
D. 8/28	3.99	81.1
D. 10/28	**3.95**	**80.3**
D. 24/28	**3.83**	**77.8**
D. 516/20	3.72	75.6
D. 15/28	**3.66**	**74.4**
D. 76/02	3.55	72.2
D. 8/27	3.46	70.3
D. 246/20	3.44	69.9
D. 6/28	2.46	50.0

D. 747/13, the first seedling on the list, has appeared in only one field trial which was reaped at seventeen and three quarter months. It is unfortunate that no results for ratoon crops will be forthcoming in the near future since this particular field trial was abandoned as a result of the recent inundations. In the one crop reaped, D. 747/13 gave a heavy tonnage of cane with desirable juice characteristics.

P.O.J. 2878 comes second on the list. Its characteristics have been already described.

D. 309/21, the third seedling on the list, has only appeared in one field trial. It has given a heavier tonnage and a sweeter juice than the standard cane. It appears to ripen better than D. 625.

Diamond 10 appears fourth on the list. Its performance has been described.

Co. 213, a cane bred in India, is fifth on the list. It has appeared in two field trials. It gives a lower tonnage than the standard cane but is very sweet, possesses a high juice purity and ripens well. Its performance as a ratoon will be watched with interest.

D. 11/28 is one of the newer Sophia seedlings and comes sixth on the list. It has appeared in four field trials and appears to be slightly superior to the standard cane in every respect. Its performance in subsequent crops will be awaited with interest.

Co. 210, another Indian cane, appears seventh on the list. It has been reaped in two field trials and while it gives a lower tonnage than the standard it is superior in regard to its juice characteristics. It is hoped that ratoon crops will prove equally promising.

D. 195/17, the eighth seedling on the list, has only appeared in one field trial and seems to possess characteristics similar to those of the standard. It apparently ripens better.

D. 857/21, the ninth seedling on the list, has appeared in only one field trial. It gives a low tonnage but is a sweet cane which seems to ripen well.

Seedlings D. 11/24 and Berbice, which appear tenth and eleventh on the list, have only appeared in one field trial. They both give slightly heavier tonnages than the standard but are not so sweet. On the other hand, they appear to possess higher juice purities and to ripen better.

D. 1/28, the twelfth on the list, is one of the newer Sophia seedlings and has appeared in only two field trials. It gives a lower tonnage than the standard but possesses more favourable juice characteristics. Its performance as a ratoon will be watched with interest.

The standard cane, D. 625, is thirteenth on the list and has appeared in thirty-eight field trials. Its average yield as a plant cane is 4.92 tons of sucrose per acre.

There are other canes in the table which have not outyielded the standard but are nevertheless worthy of notice.

P.O.J. 253 is a cane of low tonnage but high sucrose content. It has appeared in two field trials and has ripened well.

Co. 281 has appeared in two field trials and has given a low tonnage. Compared with the standard cane it is the sweetest seedling tested and possesses a juice of high purity and low glucose ratio.

D. 9/28, which has appeared in three field trials, is a cane of low tonnage but high sucrose content.

Other canes which possess high sucrose contents but give low tonnages are D. 154/28, D. 4/28, D. 23/28, G. 119, D. 10/28, D. 15/28, D. 76/02.

Summary of Results.

During the past four years 113 seedlings have been carefully compared with the standard cane, D. 625, at well distributed sites on the Colony's sugar belt.

It is at once apparent from the results obtained that no very definite pronouncements can be made until the performance of the seedlings has been carefully recorded for plant cane, first ratoon and second ratoon crops at a number of centres.

Diamond 10 has given the best performance of all the seedlings so far tested. Its superiority rests upon the production of heavy second ratoon crops in only two field trials. Further second ratoon experiments shortly to be reaped should define the position of this variety more precisely. Diamond 10 possesses admirable juice characteristics.

P.O.J. 2878 shows considerable promise as a plant cane. Its ratooning capabilities have been, so far, insufficiently tested. It is a question whether modifications in the present planting practice would not produce even more promising results.

D. 666/18, a well known seedling, usually outyields the standard cane but it produces heavy canes of inferior sucrose content.

The standard cane, D. 625, appears to give good crops as a plant and as a first ratoon but there are indications that its performance as a second ratoon is below the average.

During the analysis of samples of cane from variety trials, 212 mean values, each representative of several individual determinations, have been obtained. These values indicate that fifty-one per cent. of the seedlings have a higher sucrose content than the standard, that seventy-eight per cent. of them possess a higher juice purity and that eighty-two per cent. of them have a lower glucose ratio than D. 625. It is apparent that the standard cane is of average sweetness, possesses a juice of inferior purity and is seldom ripe when reaped.

The two Barbados seedlings S.C. 12 (4) and B.H. 10 (12) have been given extended trial and have proved inferior to the standard cane. The former gives a heavy second ratoon crop. Both of them are sweet canes, but in view of the results here reported it is doubtful if the fairly considerable extension which has taken place on the estates of the Demerara River and of the West Coast of Demerara is justified.

Certain other canes have been tested as plants, first ratoons and second ratoons in one or two field experiments and they deserve further trial. Such canes are D. 447/17, Diamond 17, D. 927/22, D. 31/17, P.O.J. 2727 and D. 207/20.

Of the forty seedlings which have been tested only as plant canes and first ratoons, D. 628/21, D. 173/21 and D. 52/20 show considerable promise and should be placed in future experiments.

There are forty seedlings which have only been tested as plant canes, but a number of them have given promising results and many possess the desirable characteristics of average tonnage and high sucrose content.

D. 747/13, D. 309/21 and D. 857/21 have only appeared in one field trial. They have outyielded the standard cane and possess desirable juice characteristics. Their performance as ratoons will be awaited with interest. In the meantime they deserve further field trial.

Two of the Indian seedlings, Co. 213 and Co. 210, have been reaped as plant canes in two trials and have outyielded the standard. They are both sweet canes.

D. 11/28 has given a promising performance as a plant cane in four field trials and is superior to D. 625 both in tonnage and sucrose content. It is to be hoped that it possesses ratooning vigour.

D. 195/17, D. 11/24 and Berbice have been reaped in only one plant cane trial. They have outyielded D. 625 but rely for their superiority on heavy tonnages.

D. 1/28, one of the newer Sophia seedlings, has appeared in two trials and seems to be a sweet cane, slightly superior to the standard in yield.

It is of interest to compare the percentage values, taking D. 625 as 100.0, for the various characteristics of the *plant cane* crops of the more interesting varieties in the collection. These values appear in Table L.

TABLE L.

MEAN PLANT CANE RESULTS (D. 625=100.0).

Seedling.	Cane, Tons/acre.	Sucrose Per cent. cane.	Juice Purity.	Glucose Ratio.
D. 625	100.0	100.0	100.0	100.0
Diamond 10	95.9	117.7	107.6	44.5
P.O.J. 2878	105.4	111.5	105.9	62.2
D. 666/18	103.5	95.3	98.5	95.1
D. 241/21	106.4	99.6	101.8	70.8
Co. 213	94.3	118.6	114.1	44.0
D. 11/28	105.6	102.5	103.9	71.1
Co. 210	96.8	110.3	111.9	46.4
D. 1/28	94.3	106.7	104.9	75.8
P.O.J. 253	81.8	121.6	117.0	38.1
Co. 281	74.9	130.7	120.3	25.5
S.C. 12(4)	84.5	98.9	103.4	46.5
B.H. 10(12)	75.7	103.0	104.1	57.5

In conclusion it may be said that these results indicate that Diamond 10 and P.O.J. 2878 are likely to outyield the standard cane in most instances and their continued extension is recommended. It is clear too, that there are several other canes of considerable promise in the collection. It is however preferable to accumulate further experimental data before definitely advising their extension.

MANURIAL TRIALS.

This section deals with the results of fifteen manurial trials reaped during the year ending June 30, 1934. The section is divided into five sub-sections, viz., (A) trials with nitrogenous manures, (B) trials with lime-bearing materials, (C) trials with phosphatic manures, (D) trials with potassic manures and (E) discussion and summary of the results obtained.

Three of the experiments here reported are of a complex nature and include the application of two or more kinds of fertilisers. The results of these experiments are considered under two or more sub-sections.

Samples of cane have, with two exceptions, been collected from each plot of every experiment and have been thoroughly examined at the laboratory of the Experiment Station, Sophia. The results continue to indicate the considerable effect of fertiliser applications on the quality of the cane.

Under the sub-section (A) are to be found the plant cane results of two chains of latin squares dealing with the optimum application of sulphate of ammonia to cane growing on flood-fallowed frontland clays and on pegasse soils.

The monthly rainfall experienced at the trial sites is given in Appendix I where comparison is made with the monthly rainfall usually observed.

Composite samples of soil and subsoil of the experimental sites have been examined in detail and the results are recorded in Appendix II.

A calendar of the agricultural operations connected with the manurial trials is to be found in Appendix III.

SUB-SECTION A.—EXPERIMENTS WITH GRADED DRESSINGS OF NITROGENOUS MANURES.

(A1-A5) Sulphate of Ammonia on Flood-Fallowed Frontland Soils, (Plant Canes).

These five trials constitute a chain of five 4 x 4 latin squares designed to determine the economic dressing of sulphate of ammonia to the standard cane variety D.625 growing on flood-fallowed frontland soils. Samples of soil from the experimental sites were examined in the laboratory and, in cases where phosphate or potash deficiencies were indicated, basal applications of superphosphate of lime or sulphate of potash were made. All experimental areas received, at planting, a dressing of lime-bearing material, either slaked lime or ground limestone, at the rate of one ton per acre.

(A1) Pln. Port Mourant, Field No. 4., House End, Port Mourant Empolder, (Plant Canes).

The results obtained at Pln. Port Mourant appear in Table LI.

TABLE LI.

S/A. Cwt./acre.	Cane, Tons/acre.	Sucrose % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
0	53.37	13.94	7.44	88.5	5.93
2	56.67	13.81	7.83	87.1	6.55
4	50.59	13.23	6.69	86.5	8.84
6	57.24	12.78	7.32	86.8	8.95
Means	54.47	13.44	7.32	87.2	7.57

The topsoil of the experimental area is a markedly acidic clay overlying a slightly acidic clay subsoil. It is well supplied with organic matter of normal carbon: nitrogen ratio. The soluble salt content is normal.

The experiment received rainfall above the average for practically the whole of the growth season. Excessive rain was experienced during December 1933, while a period of dry weather occurred during the three weeks preceding reaping.

(A2) Pln. Rose Hall, Field No. 30., Rose Hall, (Plant Canes).

The results obtained at Pln. Rose Hall appear in Table LII.

TABLE LII.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
0	40.80	14.41	5.88	86.1	12.70
2	43.99	14.00	6.16	84.0	14.09
4	47.19	14.15	6.68	85.8	11.70
6	52.03	13.86	7.21	83.9	11.55
Means	46.00	14.10	6.49	85.0	12.51

The topsoil of the experimental area is a markedly acidic clay overlying a slightly acidic clay subsoil. The organic matter content of the topsoil is below the average, that of the subsoil is above normal. The carbon: nitrogen ratio of the topsoil is normal, that of the subsoil is wider than the average. The soluble salt content of the topsoil is normal, that of the subsoil is below the average.

During the first half of the growing period the rainfall was well distributed, but during the months of October, November and December the precipitation was excessive. A dry spell occurred during the months preceding reaping.

(*A3*) *Pln. Enmore, Field No. 8., Bachelor's Adventure, (Plant Canes).*

The results obtained at Pln. Enmore appear in Table LIII.

TABLE LIII.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
0	45.37	10.83	4.91	82.1	10.78
2	59.71	11.59	6.92	84.1	10.15
4	55.19	11.18	6.17	81.8	13.19
6	61.73	10.22	6.31	81.3	14.11
Means	55.50	10.96	6.08	82.3	12.06

The topsoil of the experimental area is a markedly acidic clay overlying a similar subsoil. The organic matter content, the carbon: nitrogen ratio and the soluble salt content are slightly above the average encountered in this class of soil.

During the first half of the growing season the rainfall was fairly well distributed. A dry spell was experienced during September 1933, while excessive rain fell during the months of November, December and January. Drier weather occurred during the three weeks preceding grinding.

(*A4*) *Pln. Lusignan, Field No. 28 East, Good Hope, (Plant Canes).*

The results obtained at Pln. Lusignan appear in Table LIV.

TABLE LIV.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
0	44.60	12.49	5.57	82.9	15.06
2	43.85	12.45	5.46	82.2	14.84
4	42.77	11.79	5.04	80.5	18.39
6	43.24	12.12	5.24	82.0	15.51
Means	43.62	12.21	5.33	81.9	15.95

The topsoil of the experimental area consists of a markedly acidic clay overlying a similar subsoil. The organic matter of the soil is slightly above the average but the carbon:nitrogen ratio is typical of this class of soil. The soluble salt content is above the average.

For the greater part of the growing season the rainfall had been above the average, and culminated during the months of November, December and January in excessive precipitation. During the months of September and October, and during the months preceding reaping dry weather was experienced.

(A5) Pln. Uitvlugt, Field No. 14, Zeeburg, (Plant Canes).

The results obtained at Pln. Uitvlugt appear in Table LV.

TABLE LV.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
0	47.04	13.39	6.30	86.8	7.41
2	55.71	13.15	7.33	86.8	7.12
4	56.30	13.31	7.49	86.0	10.14
6	55.94	12.83	7.18	84.9	9.85
Means	53.75	13.17	7.08	86.1	8.63

The topsoil of the experimental area is a markedly acidic heavy silt overlying a similar subsoil. The soil is deficient in organic matter and the carbon : nitrogen ratio is narrow. The soil is of average salinity.

Heavy rainfall was experienced in June, while September was a particularly dry month. Excessive rains fell during the months of October, November, December and January. During the month preceding reaping a spell of dry weather was experienced.

The combined results of the five latin squares are presented in Table LVI, and are shown graphically in Figure XXXVI.

Table LVI.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
0	46.24	13.01	6.016	85.29	10.38
2	51.99	13.00	6.759	84.86	10.55
4	50.41	12.73	6.417	84.12	12.45
6	54.04	12.36	6.679	83.79	12.00
Means	50.67	12.78	6.475	84.51	11.34
S.E. of treatment means,	1.332	0.140	0.170	0.345	0.526
Significant Differences (20: 1)	3.85	0.41	0.492	1.00	1.52

'Z' value obtained for effect of nitrogen on tons cane per acre.....=0.9085
'Z' value obtained for effect of nitrogen on sucrose content of cane.....=0.7775
'Z' value obtained for effect of nitrogen on juice purity.....=0.6842
'Z' value obtained for effect of nitrogen on glucose ratio.....=0.6775
'Z' value required for P=0.05.....=0.5362
'Z' value required for P=0.01.....=0.7531

NOTE : A difference between the results of various treatments, greater than the significant difference, would occur by the chance only five times in every hundred similar trials. The significant difference in this and other trials is obtained by multiplying the standard error of the difference of two means by the appropriate value of 't' found in Fisher's Table.

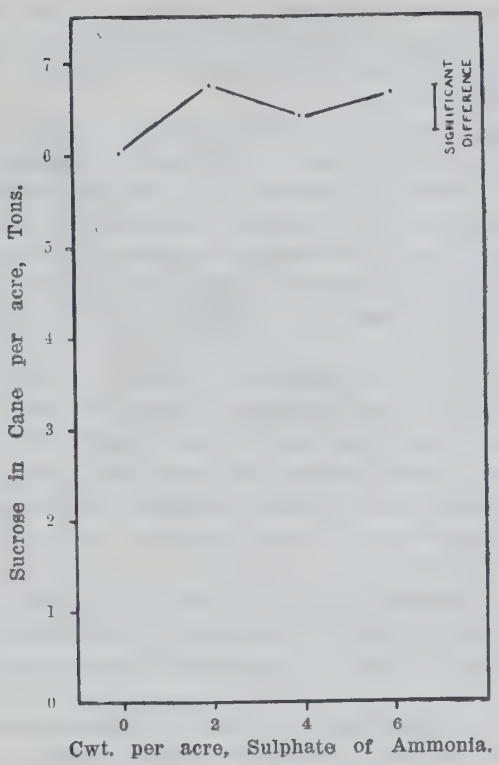

FIG. XXXVI.

Effect of Sulphate of Ammonia on Flooded Frontland Soils (Plant Canes).

The dressings of sulphate of ammonia have had a definite effect upon the weight of cane, the sucrose content of the cane, the glucose ratio and the juice purity.

Conclusions :—The following general conclusions, referring to the variety D.625, may be drawn from the results of these experiments :—

(a) As far as cane tonnage is concerned, a dressing of sulphate of ammonia at the rate of 2 cwt. per acre gives an increase yield of 5.75 tons of cane (11.3 per cent.). Applications at the rate of 4 cwt. and 6 cwt. per acre do not give further significant increases.

(b) The sucrose content of the cane is not definitely affected by applications of sulphate of ammonia at the rate of 2 cwt. or 4 cwt. per acre. A dressing at the rate of 6 cwt. per acre leads to a significant reduction of 0.65 per cent. (5.1 per cent. of the mean) in the sucrose content.

(c) As regards the juice purity, a dressing of 2 cwt. per acre of sulphate of ammonia has no definite effect but applications at the rate 4 cwt. and 6 cwt. per acre cause a significant decrease of 1.2 points and 1.5 points respectively.

(d) As regards the glucose ratio, a gauge of the maturity of the cane, a dressing of 2 cwt. per acre of sulphate of ammonia has no definite effect. Heavier applications have a significant adverse affect.

(e) The important value, from the economic standpoint, is the yield of sucrose per acre. A dressing of sulphate of ammonia at the rate of 2 cwt. per acre produces a significant increase of 0.743 ton of sucrose per acre (11.5 per cent. of the mean). Dressings at the rate of 4 cwt. and 6 cwt. produce no further definite increment in yield.

(A6) Sulphate of Ammonia on Flooded Frontland Clay (Pln. Port Mourant, Second Ratoons).

(Plant cane results reported in Sugar Bull. No. 1 pp. 43-46).
(First ratoon results reported in Sugar Bull. No. 2. pp. 20-24).

This trial involves graded dressings of sulphate of ammonia and of pulverised limestone, in all combinations. The results for the different limestone dressings are considered in sub-section B.

The topsoil is a markedly acidic clay overlying a slightly acidic clay subsoil. It contains an average amount of organic matter with a normal carbon : nitrogen ratio. The soluble salt content of the subsoil is similar to that of other soils of this class.

The rainfall during practically the whole of the growth season was above the average. Excessive rain was experienced during December, while a dry period occurred during the two months preceding reaping.

The results obtained with the second ratoon crop appear in Table LVII and are presented graphically in Figure XXXVII where the yield curves for the plant cane and for the first ratoon crops are included for comparison.

Table LVII.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, Tons/acre.	Per cent. of mean.
0	19.66	2.73	66.3
2	27.25	3.78	91.9
4	35.79	4.97	120.7
6	35.86	4.98	121.0
Means	29.64	4.12	100.0
S.E. of treatment means	1.534	0.213	5.18
Significant Differences	4.43	0.62	14.9

"Z" value obtained for effect of nitrogen on weight of cane.....=1.6245
"Z" value required for P=0.01.....=0.7531

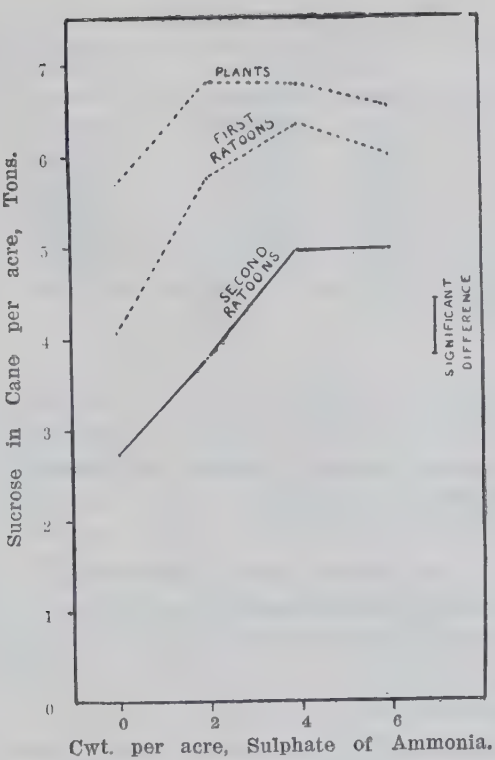

FIG. XXXVII.

Effect of Sulphate of Ammonia on Flooded Frontland Clay (Plant Canes, First and Second Ratoons).

The results indicate that the various dressings of sulphate of ammonia have had a considerable effect upon the weight of cane, upon the juice purity and upon the glucose ratio. They have, however, had no definite effect upon the sucrose content of the cane. Values for tons cane per acre have consequently been multiplied by the general mean figure for the percentage of sucrose in cane (13.89%) in order to obtain values for the tons of sucrose per acre.

The effects of the nitrogenous dressings on the juice purity and glucose ratio are shown in Table LVIII.

TABLE LVIII.

S/A, Cwt./acre.	Juice Purity		Glucose Ratio	
	Actual.	Per cent. of mean.	Actual.	Per cent. of mean.
0	89.4	101.1	5.04	75.9
2	88.5	100.1	6.38	96.1
4	87.8	99.3	7.42	111.7
6	87.7	99.2	7.74	116.6
Means	88.4	100.0	6.64	100.0
S.E. of treatment means.	0.43	0.49	0.363	5.47
Significant Differences	1.3	1.5	1.05	15.8

"Z" value obtained for effect of nitrogen on juice purity.....=0.6558
"Z" value obtained for effect of nitrogen on glucose ratio.....=1.2046
"Z" value required for P=0.05.....=0.5362
"Z" value required for P=0.01.....=0.7531

Conclusions :—Under the conditions of the experiment :—

(a) Dressings of sulphate of ammonia produce increases in the second ratoon crop on flood fallowed clay soils.

(b) A dressing at the rate of 2 cwt. per acre gives a definitely higher yield of cane than the control.

(c) A dressing of 4 cwt. per acre gives a definitely higher yield of cane than that obtained with a dressing at the rate of 2 cwt. per acre ;

(d) No difference in yield of cane is noted between the 4 cwt. application and the 6 cwt. application.

(e) The various dressings of sulphate of ammonia have had no definite effect on the sucrose content of the cane.

(f) The heavier dressings of sulphate of ammonia (4 cwt. per acre and 6 cwt. per acre) cause a drop in juice purity when compared with the values obtained from the control plots.

(g) Dressings of sulphate of ammonia progressively affect the glucose ratio. No definite difference is to be noted in the effects of the 4 cwt. and 6 cwt. applications.

(h) Applications of ground limestone at planting have no significant interaction with doses of sulphate of ammonia made to the second ratoons.

(i) From the results of this experiment it appears that a dressing at the rate of 2 cwt. per acre is the most profitable for plant canes while for subsequent ratoons applications at the rate of 4 cwt. per acre are desirable.

(A7) Sulphate of Ammonia on Unflooded Frontland Clay (Sophia Experiment Station, Second Ratoons).

(Plant cane and first ratoon results reported in Sugar Bull. No. 1, pp. 52—57)

The objects of this experiment have been described in a previous Bulletin. The trial involves graded dressings of sulphate of ammonia in the presence and absence of heavy dressings of ground limestone, superphosphate of lime, ground rock phosphate and sulphate of potash. The effect of these other manures will be described under their appropriate sections and any definite interactions will be noted.

The topsoil is a markedly acidic clay, overlying a slightly acidic clay. It contains an average amount of organic matter, of typical carbon : nitrogen ratio. The topsoil contains a fair amount of soluble salts, the amount present in the subsoil is considerable.

The crop experienced a very dry period during November and a wet period during the following August. For the rest of the growth period the rainfall was well distributed.

The results of the experiment are presented in Table LIX and are shown graphically in Figure XXXVIII where the yield curves for the plant canes and first ratoons are included for comparison.

Table LIX.

S/A,	Cane, Tons/acre,		Sucrose in cane, per cent.		Sucrose, Tons/acre,	
Cwt./acre.	Actual.	Per cent. of mean.	Actual.	Per cent. of mean.	Actual.	Per cent. of mean.
nil.	9.72	69.0	14.40	103.7	1.40	71.4
1.70	13.87	98.5	14.12	101.7	1.96	100.0
3.40	15.43	109.6	13.65	98.3	2.11	107.7
5.10	17.29	122.8	13.39	96.4	2.32	118.4
Means	14.08	100.0	13.89	100.0	1.96	100.0
S.E. of treatment means	0.598	4.25	0.121	0.871	0.079	4.03
Significant Differences	1.73	12.3	0.35	2.52	0.23	11.6

'Z' value obtained for the effect of treatment on yield of cane ....= 1.7380
'Z' value obtained for the effect of treatment on sucrose content of cane= 1.3227
'Z' value required for P.=0.01.....=0.7086

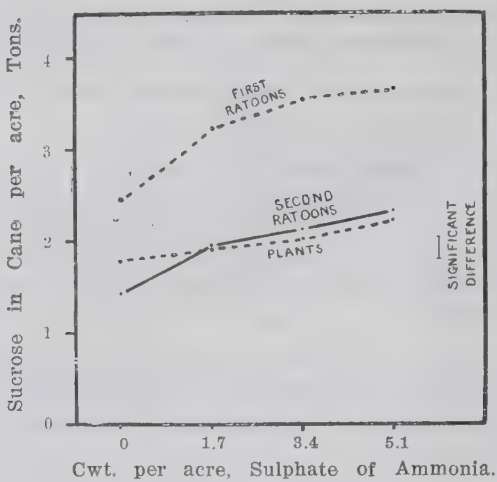

FIG. XXXVIII.

Effect of Sulphate of Ammonia on Unflooded Frontland Clay (Plant Canes, First and Second Ratoons).

The results obtained for the weight of cane indicate that a definite interaction exists between the various dressings of sulphate of ammonia and the application of ground limestone made at planting. No such interaction exists when the sucrose content of the cane is considered. The figures representing the interaction in tons of sucrose per acre are presented in Table LX and in Figure XXXIX.

TABLE LX.

SUCROSE, TONS PER ACRE.

S/A. Cwt./acre.	Ground Limestone, Tons/acre,	
	nil.	10 Tons.
nil	0.96	1.84
1.70	1.89	2.03
3.40	2.21	2.00
5.10	2.32	2.31
S.E. of treatment means	0.118	
Significant Difference	0.34	

'Z' value obtained for interaction of nitrogen and residual limestone on yield of cane..... =1.0761

'Z' value required for P=0.01..... =0.7086

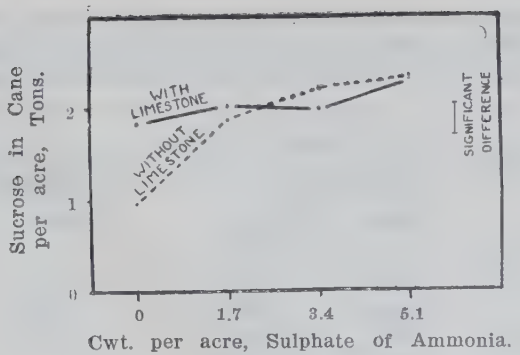

FIG. XXXIX.

Effect of Sulphate of Ammonia on Unflooded Frontland Clay in presence and absence of Ground Limestone (Second Ratoons).

The results indicate that the various fertilisers have had an effect upon the quality of the cane and of the juice.

The effects of the various dressings of sulphate of ammonia in the presence and absence, of limestone and of sulphate of potash on the sucrose content of the cane are presented in Table LXI.

TABLE LXI.

PERCENTAGE OF SUCROSE IN CANE.

		S/A., Cwt./acre.			
		nil	1.70	3.40	5.10
Limestone	Potash	14.82	14.30	13.44	13.59
	No Potash	14.12	14.14	13.69	13.60
No Limestone	Potash	14.24	14.22	13.91	13.78
	No Potash	14.43	13.92	13.57	12.59
S.E. of treatment means			0.242		
Significant Difference			0.73		

'Z' value obtained for interaction of nitrogen, limestone and potash on the sucrose content of the cane ..... = 0.5914

'Z' value required for P = 0.05 ..... = 0.5073

It seems that in the absence of limestone, dressings of potash are necessary if the undesirable effects of heavier dressings of sulphate of ammonia are to be eliminated. When limestone is present the heavier dressings of sulphate of ammonia adversely affect the sucrose content of the cane only when residual potash is present.

Statistical examination of the results indicates that dressings of sulphate of ammonia have a definite effect upon the juice purity and the glucose ratio in the second ratoon cane. The results are presented in Table LXII.

TABLE LXII.

S/A., Cwt./acre.	Juice Purity, Actual.	Juice Purity, Per cent. of mean.	Glucose Ratio, Actual.	Glucose Ratio, Per cent. of mean.
nil	85.9	101.4	9.28	88.1
1.70	85.4	100.8	9.43	89.6
3.40	84.1	99.3	11.62	110.4
5.10	83.5	98.6	11.77	111.8
Means	84.7	100.0	10.53	100.0
S.E. of treatment means	0.34	0.40	0.425	4.04
Significant Differences	1.0	1.2	1.23	11.7

'Z' value obtained for effect of nitrogen on juice purity ..... =1.1984
'Z' value obtained for effect of nitrogen on glucose ratio ..... =1.1579
'Z' value required for P=0.01 ....0.7086

It is apparent that the heavier dressings of sulphate of ammonia adversely affect the juice purity and the glucose ratio. Further examination of the results indicates that there are definite interactions between ground limestone and sulphate of ammonia and between sulphate of potash and sulphate of ammonia as far as the glucose ratio is concerned. The results of the interaction of ground limestone and sulphate of ammonia on the glucose ratio are presented in Table LXIII.

TABLE LXIII.

GLUCOSE RATIO.

S/A, Cwt./acre.	No Limestone.	Limestone, 10 Tons/acre.
nil	8.65	9.92
1.70	9.61	9.25
3.40	11.21	12.03
5.10	12.88	10.66
S.E. of treatment means	0.601	
Significant Difference	1.74	

'Z' value obtained for interaction of ground limestone and nitrogen ..... =0.6079
'Z' value required for P=0.05 ..... =0.5079

In the absence of ground limestone the heavier dressings of sulphate of ammonia have an adverse effect on the glucose ratio. Ground limestone applied at planting has a residual effect which nullifies the untoward effects of heavy dressings of sulphate of ammonia on the ripening of the cane.

The results of the interaction of residual sulphate of potash and of sulphate of ammonia on the glucose ratio are presented in Table LXIV.

TABLE LXIV.

GLUCOSE RATIO.

S/A, Cwt./acre.	No Sulphate of Potash.	Sulphate of Potash.
nil	9.51	9.06
1.70	9.90	8.97
3.40	11.97	11.27
5.10	13.66	9.88
S.E. of treatment means	0.601	
Significant Difference	1.74	

'Z' value obtained for interaction of potash and nitrogen..... =0.6054
'Z' value required for P=0.05..... =0.5073

In the absence of sulphate of potash the heavier dressings of sulphate of ammonia have an adverse effect upon the glucose ratio. Sulphate of potash, applied at planting, has a residual effect which neutralises the adverse effect of the heaviest dressing of sulphate of ammonia on the ripening of the cane.

Conclusions :—Under the conditions of the experiment :—

(a) Dressings of sulphate of ammonia to second ratoon canes increase the tonnage but reduce the sucrose content of the cane.

(b) As regards the effect on the yield of sucrose per acre a dressing at the rate of 3.40 cwt. per acre is not definitely better than one of 1.70 cwt. per acre. A dressing at the rate of 5.10 cwt. per acre gives a greater return than one of 1.70 cwt. per acre but is not definitely superior to an application at the rate of 3.40 cwt. per acre.

(c) An interaction, similar to that obtained in the first ratoon crop, between the dressings of sulphate of ammonia and that of ground limestone is noted in connection with the yield of cane.

(d) In the absence of ground limestone, the initial yield (without fertiliser) is low, but increases rapidly with single and double dressings of sulphate of ammonia, the treble dressing gives no further increase in yield.

(e) In the presence of ground limestone the single and double dressings of sulphate of ammonia have no definite influence on the yield. The treble dressing gives a significantly better yield than that obtained with no fertiliser.

(f) With regard to the sucrose content of the cane there is a definite interaction between the applications of sulphate of ammonia and the residual effects of the ground limestone and of the sulphate of potash. In the absence of limestone it is necessary to apply potash if the undesirable effects of the heavier dressings of sulphate of ammonia are to be eliminated. When limestone is present the heavier dressings of sulphate of ammonia adversely affect the sucrose content of the cane only when residual potash is present.

(g) The heavier dressings of sulphate of ammonia adversely affect the juice purity and the glucose ratio.

(h) With regard to the glucose ratio a definite interaction occurs between the dressings of sulphate of ammonia and the residual effects of ground limestone. In the absence of limestone the heavier dressings of sulphate of ammonia have an untoward effect upon the glucose ratio. In the presence of limestone these adverse effects are eliminated.

(i) A similar interaction as regards the glucose ratio is noted between the dressings of sulphate of ammonia and the residual effects of sulphate of potash.

(A8) Sulphate of Ammonia and an Organic Nitrogenous Manure on Unflooded Frontland Heavy Silt, (Sophia Experiment Station, First Ratoons).

(*Plant cane results reported in Sugar Bull. No. II, pp. 29-31.*)

This experiment, in Field 2 E., involves graded dressings of sulphate of ammonia applied to first ratoon cane and the residual effect of an application of Bacterised Peat given at planting. The Bacterised Peat was supplied for field trial by the makers.

The topsoil of the experimental area is a markedly acidic heavy silt overlying a markedly acidic clay. It contains an average amount of organic matter with a carbon : nitrogen ratio slightly wider than usual. Both topsoil and subsoil contained, at the time of sampling, a considerable amount of soluble salts.

The rainfall during the growth period has been above the average and culminated in excessive precipitation during the months of December and January.

The results of the first ratoon crop are presented in Table LXV and are graphically presented in Figure XL where the plant cane results are included for comparison.

TABLE LXV.

Fertiliser, Rate/acre.		Cane, Tons/acre. Actual.	Cane, Tons/acre. Per cent. of mean.	Sucrose in Cane, Per cent. Actual.	Sucrose in Cane, Per cent. Per cent. of mean.	Sucrose, Tons/acre. Actual.	Sucrose, Tons/acre. Per cent. of mean.
Bacterised Peat	1 ton[1]	22.15	92.9	12.54	101.0	2.78	93.9
Control	nil	20.74	87.0	12.73	102.6	2.64	89.2
Sulphate of ammonia	3 cwt.	25.79	108.2	12.84	103.5	3.31	111.8
" "	6 cwt.[2]	25.95	108.9	12.01	96.8	3.12	105.4
" "	6 cwt.	24.56	103.0	11.93	96.1	2.93	99.0
Means		23.84	100.0	12.41	100.0	2.96	100.0
S.E. of treatment means		1·189	5.00	0.241	1.94	0.148	5.00
Significant Differences		3.56	14.9	0.72	5.8	0.44	14.9

[1] Applied to the plant canes only.
[2] In two equal doses.

'Z' value obtained for effect of treatment on yield of cane.....=0.5424
'Z' value obtained for effect of treatment, on sucrose content of cane.....=0.6631
'Z' value required for P=0.05.....=0.4947

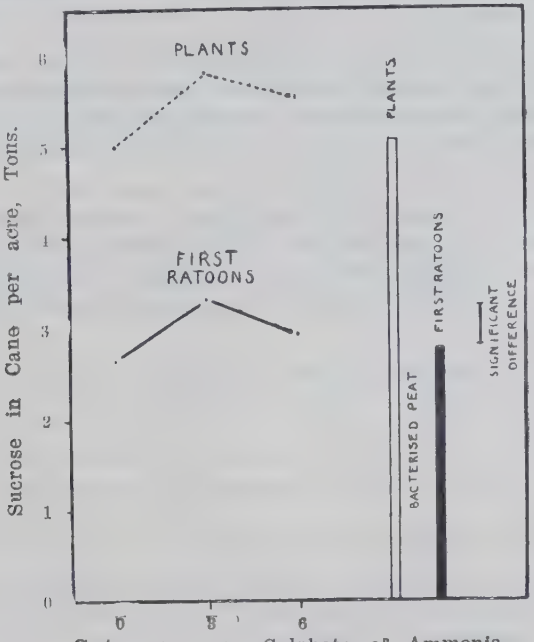

FIG. XL.

Effect of Nitrogenous Manures on Unflooded Frontland Heavy Silt (Plant Canes and First Ratoons).

Statistical examination of the results indicates that the various applications had no definite effect upon either the juice purity or the glucose ratio.

The general mean figures for these two characteristics are :

Purity	85.80
Glucose ratio	8.47

Conclusions :—Under the conditions of the experiment :—

(a) A dressing of Bacterised Peat at the rate of one ton per acre applied at planting has had no residual effect upon yield of cane, the sucrose content of the cane, the juice purity nor upon the glucose ratio. It cannot be argued that the cane on the plots dressed with Bacterised Peat received an overdose of nitrogen for the cane from these plots showed no drop in sucrose content while on the plots receiving dressings of sulphate of ammonia at the rate of 6 cwt. per acre the cane definitely contained less sucrose.

(b) Dressings of sulphate of ammonia at the rate of 3 cwt. per acre gave a definite increase in the yield of cane and did not adversely affect the sucrose content.

(c) The split dressing of sulphate of ammonia, 3 cwt. per acre at planting and 3 cwt. per acre six weeks after planting, did not increase the yield of cane and definitely decreased the sucrose content as compared with the cane dressed with a single application at the rate of 3 cwt. per acre.

(d) The single dressing of sulphate of ammonia at the rate of 6 cwt. per acre did not increase the yield of cane over that obtained by a single application of 3 cwt. per acre. It had a definitely adverse effect upon the sucrose content. This single dressing at the rate of 6 cwt. per acre did not differ in its effects from the split application of sulphate of ammonia.

(e) None of the fertiliser applications had an effect upon the juice purity or the glucose ratio.

(A9) THE RESIDUAL EFFECT OF SULPHATE OF AMMONIA ON UNFLOODED FRONTLAND HEAVY SILT. (SOPHIA EXPERIMENT STATION, FIRST RATOONS).

(*Plant cane results reported in Sugar Bull. No. 2, pp. 32-34.*)

It has been shown that large dressings of sulphate of ammonia to heavy clay soils in the Sudan may have a definite residual effect on the succeeding crop. The experiment here described was designed to test this point on the Colony's sugar cane soils. The matter is of considerable interest since our field experiments designed to determine the optimum dressing of sulphate of ammonia to plant canes and succeeding crops are always carried through the three crops on the

same experimental areas. Plots receiving an application at the rate of 6 cwt. per acre to the plant canes are given similar dressings with the first ratoon and second crops. Consequently it is important to ascertain whether any residual effects may manifest themselves.

In the plant cane crop two sets of plots received dressings at the rate of 6 cwt. per acre while two other sets received applications at the rate of 3 cwt. per acre. One set of plots received no sulphate of ammonia at all.

With the first ratoon crop one set of plots of each treatment received dressings similar to that given to the plant cane crop. The other set of plots of each treatment received no sulphate of ammonia with the first ratoons. It is upon these plots that the residual effect, if any, should be discernable.

The rainfall during the growth period was generally above the average, and excessively heavy weather was experienced during the months of December and January.

The experimental area adjoins the site of the previous experiment and one set of composite soil samples was collected from the two areas. The results of their laboratory examination have been discussed on a previous page.

The yields obtained with the first ratoon crop are shown in Table LXVI and presented graphically in Figure XLI, where the plant cane results are included for comparison.

TABLE LXVI.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, Tons/acre.	Per cent. of mean.
nil	20.79	3.08	86.9
3 cwt. residual	21.02	3.12	87.9
3 cwt.	26.71	3.96	111.7
6 cwt. residual	22.66	3.36	94.7
6 cwt.	28.43	4.22	118.9
Means	23.92	3.55	100.0
S.E. of treatment means	1.721	0.255	7.19
Significant Differences	5.30	0.79	22.2

'Z' value obtained for effect of treatments on yield of cane.....=0.6982
'Z' value required for P = 0.05.....=0.5106

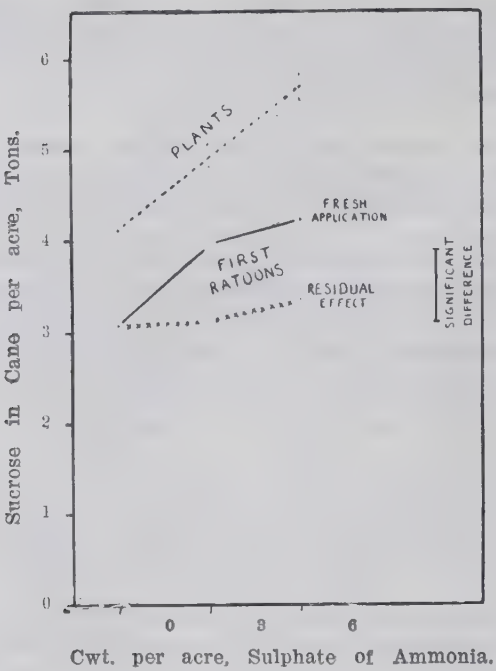

FIG. XLI.

Effect of Sulphate of Ammonia on Unflooded Frontland Heavy Silt (Plant Canes and First Ratoons).

The lack of effect of the residual dressings on the first ratoon crop may be further emphasised by presenting the results as in Table LXVII, where the first ratoon yields for both levels of nitrogen are averaged.

TABLE LXVII.

	Sucrose in cane, Tons/acre.
Sulphate of ammonia applied to plants and first ratoons ...	4.09
Sulphate of ammonia applied to plants only	3.24
Difference	0.85

Such a large difference would not occur by chance even once in ahundred similar trials. The difference between the control plot yields and those of the 6 cwt. residual plots (0.28 ton sucrose per acre) would occur by chance between forty and fifty times in a hundred similar trials.

The fertiliser dressings had no definite effect upon the sucrose content of the cane, the juice purity nor upon the glucose ratio and their general mean values for the experiment are :—

Percentage of sucrose in cane	...	...	14.83
Purity	...	...	89.7
Glucose ratio	...	...	4.92

Conclusions :—Under the conditions of the experiment :—

(a) Dressings of sulphate of ammonia at the rate of 3 cwt. or 6 cwt. per acre, applied to the plant canes, have no residual effect upon the yield of cane, the sucrose content of the cane, the juice purity nor on the glucose ratio of the first ratoon crop.

(A10—12). Sulphate of Ammonia on Pegassy Clay Soils, (Plant Canes).

This chain of 5 x 5 latin squares was designed to determine the economic dressings of sulphate of ammonia to canes of the variety D. 625 growing on pegassy clay soils, *i.e.*, on soils of abnormally wide carbon : nitrogen ratio. The chain consists of six latin squares. The results of only three of the squares are available for discussion. The remaining three squares will be reaped at a future date. Samples of soil from the experimental sites were examined in the laboratory and in cases where potash or phosphate deficiencies were indicated basal dressings of sulphate of potash or basic slag were made. All experimental areas received at planting a dressing of lime-bearing material, either slaked lime or ground limestone, at the rate of one and a half tons per acre.

(A10). Pln. Lusignan. Field No. 4 East, Lusignan Empolder, (Plant Canes).

The results obtained at Pln. Lusignan appear in Table LXVIII.

Table LXVIII.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
0	48.22	12.91	6.03	86.1	13.37
2	46.36	12.64	5.80	84.2	13.96
4	46.75	12.34	5.84	84.3	13.85
6	49.02	12.42	6.13	83.6	17.65
8	48.66	12.17	6.08	84.1	17.08
Means	47.80	12.50	5.98	84.5	15.18

The topsoil of the experimental area is a highly acidic pegassy clay overlying a similar subsoil. The organic matter content and the carbon : nitrogen ratio are lower than the average for soils of this class. There are indications that the soil of the experimental area still retains some of the characteristics of the frontland clay soil from which it was derived.

For the greater part of the growing season the rainfall was above the average and during the months of November, December and January the weather was exceptionally heavy. During the months of September and October and during the month preceding reaping, dry weather was experienced.

(A11). PLN. VERSAILLES, FIELD 31, R.D.Z., (PLANT CANES).

The results obtained at Pln. Versailles appear in Table LXIX.

TABLE LXIX.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
0	16,89	13,36	2,26	87,6	13,18
2	21,03	13,30	2,80	87,5	11,27
4	22,87	13,92	3,18	88,4	12,83
6	24,60	13,12	3,23	86,6	12,61
8	25,22	12,79	3,23	86,4	15,62
Means	22,12	13,30	2,94	87,1	13,10

The topsoil of the experimental area is a markedly acidic clay overlying a similar subsoil. The soil is well supplied with organic matter with a wide carbon : nitrogen ratio. The amounts of soluble salts present are very low.

The rainfall was fairly well distributed during the first half of the growing period, the deficiency during July being counterbalanced by an excess during August. During November, December and January the rainfall was excessive. A dry spell was experienced during the month preceding reaping.

(A12). PLN. UITVLUGT, FIELD 94 MET-EN-MEERZORG, (PLANT CANES).

The results obtained at Pln. Uitvlugt appear in Table LXX.

TABLE LXX.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, % Cane.	Sucrose, Tons/acre.	Juice Purity.	Glucose Ratio.
0	17.11	13.68	2.34	87.9	8.67
2	20,03	13.95	2.79	86.9	9.96
4	21.73	13.58	2.95	87.0	9.51
6	26.35	14.00	3.69	88.5	9.63
8	28.47	13.60	3.87	87.5	9.94
Means	22.74	13.76	3.13	87.6	9.54

The topsoil of the experimental area is a highly acidic pegassy clay overlying a similar subsoil. The organic matter content is of normal value but the carbon : nitrogen ratio is wider than that usually found in soils of this class.

The canes experienced dry weather during the month following planting but during the greater part of the growing season the rainfall was normal. During the two months preceding reaping the precipitation was above the average.

The combined results of the three latin squares are presented in Table LXXI and shown graphically in Figure XLII.

TABLE LXXI.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, Tons/acre.	Per cent. of mean.
0	27.41	3.61	88.7
2	29.14	3.84	94.3
4	30.45	4.01	98.6
6	33.33	4.39	107.9
8	34.11	4.50	110.4
Means	30.89	4.07	100.0
S.E. of treatment means	1.309	0.172	4.24
Significant Differences	3.79	0.50	12.3

'Z' value obtained for effect of nitrogen on yield of cane ..... = 1.2281
'Z' value obtained for interaction of treatments and squares ..... = 0.4624
'Z' value required for P = 0.01 (Treatment) ..... = 0.6954
'Z' value required for P = 0.05 (Interaction) ..... = 0.4090

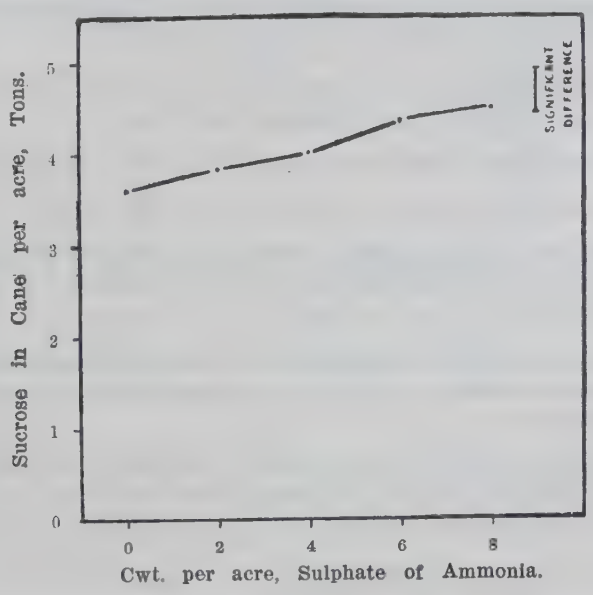

FIG. XLII.

Effect of Sulphate of Ammonia on Pegassy Clay (Plant Canes).

The various dressings of sulphate of ammonia had no definite effect upon the sucrose content of the cane, the juice purity nor the glucose ratio.

The general mean values for the characteristics unaffected by treatment are :—

Percentage of sucrose in cane			...	13.18
Purity	...	...	...	86.38
Glucose ratio		...	...	12.61

The following general conclusions may be drawn from the above results :—

Conclusions :—Under the conditions of the experiments :—

(a) As regards the yield of cane, or of sucrose, dressings of sulphate of ammonia at the rate of 2 cwt. and 4 cwt. per acre have no definite effect as compared with the control plots. An application at the rate of 6 cwt. per acre produces a definite yield increase of 5.92 tons of cane or 0.78 tons of sucrose (19.1 per cent of the mean). A dressing at the rate of 8 cwt. per acre gives no further definite increase in yield. The applications of sulphate of ammonia have different effects on different areas of pegasse or under differing climatic conditions.

(b) Dressings of sulphate of ammonia up to and including 8 cwt. per acre on pegasse soils have no appreciable effect upon the sucrose content of the cane, the juice purity or on the glucose ratio.

(A13). Sulphate of Ammonia on Pegassy Clay, (Pln. Farm, Second Ratoons).

(*Plant cane results reported in Sugar Bull. No. I, pp. 57—60).*

(*First ratoon results reported in Sugar Bull. No. II, pp. 34—37).*

This experiment involves graded dressings of sulphate of ammonia and pulverised limestone in all combinations. A few treatments of sulphate of potash were included.

The soil is a highly acidic pegassy clay. It contains a considerable amount of organic matter, possessing a wide carbon : nitrogen ratio. The amount of soluble salts present is low.

During the first part of the growth period a dry spell was experienced, while in November, December and January an abnormal amount of rain fell. The last three months preceding reaping were marked by a period of dry weather.

The yields obtained in the second ratoon crop are presented in Table LXXII and are shown graphically in Figure XLIII where the results of preceding crops are included for comparison.

TABLE LXXII.

S/A, Cwt./acre.	Cane, Tons/acre.	Sucrose, Tons/acre.	Per cent. of mean.
nil	11.71	1.80	79.6
2	14.23	2.19	96.7
4	16.17	2.49	109.9
6	16.78	2.58	114.0
Means	14.72	2.26	100.0
S.E. of treatment means	0.402	0.062	2.73
Significant Differences	1.16	0.18	7.9

'Z' value obtained for effect of nitrogen on yield of cane.....=1.7379
'Z' value required for P=0.01.....=0.7086

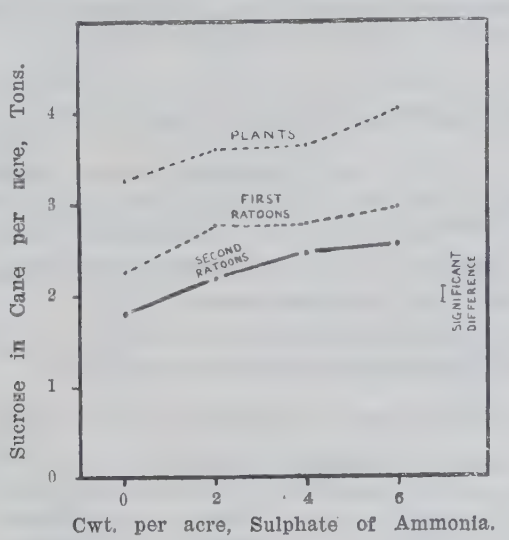

FIG. XLIII.

Effect of Sulphate of Ammonia on Pegassy Clay (Plant Canes, First and Second Ratoons).

Further statistical examination of the analytical values obtained indicates that the dressings of sulphate of ammonia had no definite effect upon the sucrose content of the cane, the juice purity nor on the glucose ratio. The general mean analytical figures for the experiment are :—

Percentage of sucrose in cane	15.38
Purity	91.4
Glucose ratio	6.16

Conclusions:—Under the conditions of the experiment:—

(a) Dressings of sulphate of ammonia have a definite effect on the yield of canes in the second ratoon crop.

(b) A dressing at the rate of 4 cwt. per acre sulphate of ammonia gives a definitely higher yield than that obtained with an application at the rate of 2 cwt. per acre. Increasing the dressing to 6 cwt. per acre does not produce a definite increase in yield.

(c) The dressings of sulphate of ammonia have no definite effect upon the sucrose content of the cane, the juice purity nor on the glucose ratio.

SUB-SECTION B.—EXPERIMENTS WITH LIME BEARING MATERIALS.

(B1) Ground Limestone in the Row on Flooded Frontland Clay (Pln. Port Mourant, Second Ratoons).

(*Plant cane results reported in Sugar Bull. No. I, p. 61*)

(*First ratoon results reported in Sugar Bull. No. II, pp. 37-38*).

This experiment involves graded dressings of ground limestone and graded dressings of sulphate of ammonia in all combinations. The effects of the latter fertiliser have been discussed in this Bulletin (Sub-section A, Exp. 6.)

The limestone dressings were applied at planting and the results here reported show the residual effect upon the second ratoons.

The nature of the experiment and the soil, the calendar of agricultural operations and the rainfall experienced have already been described.

The yields of the second ratoon crop appear in Table LXXIII.

Table LXXIII.

Fertiliser.	Rate, Tons/acre.	Cane, Tons/acre.	Sucrose, Tons/acre.	Per cent. of mean.
Control	0	28.92	4.02	97.6
Ground limestone	1	27.37	3.80	92.3
" "	3	30.58	4.24	103.2
" "	6	31.69	4.40	106.9
Means	—	29.64	4.12	100.0
S.E. of treatment means	—	1.534	0.213	5.18
Significant Differences	—	4.43	0.62	14.9

'Z' value obtained for effect of treatment on yield of cane.....=0.2110
'Z' value required for P=0.05.....=0.5362

The various applications of limestone made at planting have therefore had no residual effect upon the yield of cane in the second ratoon crop.

Statistical analysis also indicates that these dressings of ground limestone had no definite effect upon the sucrose content of the cane, the juice purity nor on the glucose ratio of the second ratoon crop.

The general mean values for these characteristics are:—

Percentage of sucrose in cane	13.89
Purity	88.4
Glucose ratio	6.64

Conclusions:—Under the conditions of the experiment:—

(a) Dressings of ground limestone, applied in the row at planting, have *no* definite residual effect in the second ratoon crop upon the yield of cane, the sucrose content of the cane, the juice purity nor upon the glucose ratio.

Dressings of limestone, given at planting have during the three crops produced the following yields.

TABLE LXXIV.

TOTAL SUCROSE, TONS PER ACRE, IN THREE CROPS

Ground Limestone, Tons/acre.	Sucrose, Tons/acre.
0	15.64
1	15.53
3	16.38
6	16.94

It is unlikely, from the run of figures, that the applications of ground limestone have produced a definite effect on yield during the three crops. It is apparent, in any case, that such returns do not cover the cost of the operation.

(B2) GROUND LIMESTONE AND SLAKED LIME IN THE ROW ON FLOODED FRONTLAND CLAY, (PLN. LEONORA, SECOND RATOONS).

(*Plant cane results reported in Sugar Bull. No. I, pp. 61-63*).

(*First ratoon results reported in Sugar Bull. No. II, pp. 38-39*).

The experiment involves graded dressings of pulverised limestone and graded dressings of slaked lime applied in the row before planting. The results here presented are concerned with the possible residual effects on the second ratoon crop.

The experimental area has been described in previous Bulletins.

During the first part of the growing season the rainfall was fairly well distributed. Excessive amounts of rain fell during the months of November, December and January. During the three months preceding reaping a dry spell occurred.

The yields obtained with the second ratoon crop are presented in Table LXXV.

TABLE LXXV.

Fertiliser.	Rate, Tons/acre.	Cane, Tons/acre.	Sucrose, Tons/acre.	Per cent. of mean.
Control	nil	30.07	4.27	97.5
Slaked lime	1	31.40	4.46	101.8
" "	2	30.31	4.31	98.4
" "	5	31.91	4.53	103.4
Ground limestone	1	30.22	4.29	97.9
" "	2	29.97	4.26	97.3
" "	5	31.77	4.51	103.0
Means	—	30.81	4.38	100.0
S.E. treatment of means	—	1.022	0.145	3.32
Significant Differences	—	3.00	0.43	9.7

'Z' value obtained for effect of quantity on yield of cane.....=0.0659
'Z' value required for P=0.05.....=0.5073

The results indicate that neither the quantity nor quality of the lime-bearing material applied at planting had any residual effect upon the yield of cane in the second ratoon crop.

It was not possible to analyse samples of cane from the individual plots of this experiment. Bulked samples representative of each treatment were examined at Sophia Experiment Station.

The general mean analytical figures for the experiment are :—

Percentage of sucrose in cane	14.21
Purity	86.5
Glucose ratio	10.00

Conclusions :—Under the conditions of the experiment :—

(a) Dressings of lime-bearing materials in the row at planting have had *no* residual effect on the yield of second ratoon cane.

(b) *No* distinction can be drawn between the efficiency of ground limestone and slaked lime.

The total yields for the three crops appear in Table LXXVI.

TABLE LXXVI.

Fertiliser.	Rate, Tons/acre.	Cane, Tons/acre.	Sucrose, Tons/acre.	Per cent. of mean.
Control	nil	98.51	13.11	98.42
Slaked lime	1	103.82	13.82	103.75
" "	2	98.01	13.05	97.97
" "	5	102.66	13.66	102.55
Ground limestone	1	97.27	12.95	97.22
" "	2	98.14	13.06	98.05
" "	5	101.93	13.57	101.88
Means	—	100.05	13.32	100.00
S.E. treatment means	—	2.584	0.344	2.584
Significant Differences	—	7.58	1.01	7.58

'Z' value obtained for effect of quantity on yield..... .....=0.0176
'Z' value obtained for effect of quality on yield.....=0.1207
'Z' value required for P=0.05 (quantity).....=0.5073
'Z' value required for P=0.05 (quality).....=0.6933

It is apparent that, throughout the course of three crops, neither the quantity nor the quality of the lime-bearing material exerted any appreciable effect upon the yield of cane.

Conclusions :—Under the conditions of the experiment :—

(a) Dressings of lime-bearing materials in the row up to five tons per acre have *no* definite effect upon the total yield of cane during three crops.

(b) No distinction can be drawn between the efficiency of ground limestone and slaked lime even when the total yields of three crops are examined.

(B3) GROUND LIMESTONE BROADCASTED ON UNFLOODED FRONTLAND CLAY, (SOPHIA EXPERIMENT STATION, PLANT CANES).

(*Plant cane results reported in Agr. Jour. B.G., IV, 2, pp. 64-68*).

(*First ratoon results reported in Sugar Bull. No. I, pp. 64-67*).

This experiment was originally planted to the variety B.H. 10 (12) and gave disappointing yields in the plant cane and first ratoon crops. The experiment was replanted with Diamond 10 variety and this report presents the results of the plant cane crop of this seedling harvested three years and ten months after the application of the various treatments.

Very low yields have again been obtained and the experimental area has been abandoned prior to flood-fallowing.

The nature and conditions of the experiment have been described in previous reports.

The young plants experienced a dry spell during the month of November but during the greater part of the growing period the rainfall was normally distributed. The month preceding reaping was wetter than usual.

The yields obtained with the plant cane crop are presented in Table LXXVII.

TABLE LXXVII.

Fertiliser.	Rate, Tons/acre.	Cane, Tons/acre.	Sucrose. Tons/acre.
Control	nil	13.73	1.85
Ground limestone	3	14.29	1.92
" "	6	13.93	1.88
" "	9	14.58	1.96
" "	12	14.19	1.91
Ground limestone + Rock phosphate	9 + 0.5	14.33	1.93
Means	—	14.17	1.91

The 'Z' value obtained for effect of treatment on yield of cane is a negative value. Consequently, the applications have had no residual effect upon the yield.

The general mean analytical figures are :—

Percentage of sucrose in cane	13.49
Purity	88.4
Glucose ratio	4.87

Conclusions :—Under the conditions of the experiment :—

(a) Applications of ground limestone, in the presence and absence of rock phosphate, made three years and ten months prior to reaping, had no residual effect on the yield of the plant cane crop.

(B4) BROADCASTED DRESSINGS OF GROUND LIMESTONE ON UNFLOODED FRONTLAND CLAY, (SOPHIA EXPERIMENT STATION, SECOND RATOONS).

(*Plant canes and first ratoon results reported in Sugar Bull. No. 1, pp. 67-70).*

Half of the plots in this experiment received at planting a broadcasted dressing of ground limestone at the rate of ten tons per acre. The trial includes combinations of other fertilisers. The effects of the varied dressings of sulphate of ammonia on the second ratoon crop have been discussed in this Bulletin (Sub-section A, Exp.7). The nature of the experiment, the character of the soil, the calendar of agricultural operations and the rainfall have already been considered.

The results of the second ratoon crop are presented in Table LXXVIII and are shown graphically in Figure XLIV.

TABLE LXXVIII.

Ground limestone, Tons/acre.	Cane, Tons/acre.	Sucrose, Tons/acre.	Per cent. of mean.
Nil	13.37	1.86	95.0
10	14.78	2.05	105.0
Means	14.08	1.96	100.0
S. E. of treatment means	0.423	0.059	3.00
Significant Differences	1.22	0.17	8.7

"Z" value obtained for effect of limestone on yield of cane.....=0.8627
"Z" value required for P=0.05.....=0.5073

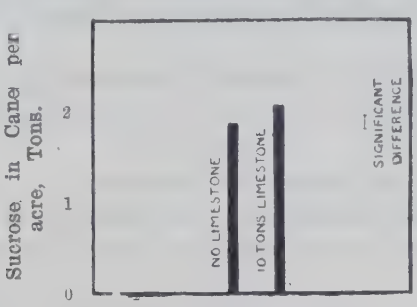

FIG. XLIV.

Effect of Ground Limestone on Unflooded Frontland Heavy Silt (Second Ratoons).

The ground limestone has had a definite residual effect on the tonnage but does not affect the sucrose content of the cane, the juice purity nor the glucose ratio. The general mean analytical figures are :—

Percentage of sucrose in cane	13.89
Purity	84.7
Glucose ratio	10.53

The interactions of nitrogen and limestone on the yield of cane and on the glucose ratio and the interaction of nitrogen, limestone and potash on the sucrose content of the cane have already been described.

A complex interaction is noted between the effects of ground limestone, potash and phosphate as regards yield of cane. The results given as tons of sucrose per acre appear in Table LXXIX.

TABLE LXXIX.

	Sucrose, Tons per acre.			
	No Ground Limestone.		Ground Limestone.	
	No Potash.	Potash.	No Potash.	Potash.
No Phosphate	1.61	1.93	2.19	1.91
Phosphate	2.11	1.78	1.80	2.32
S. E. of treatment means		0.118		
Significant Difference		0.34		

"Z" value obtained for interaction of limestone, potash and phosphate on yield of cane .....=1.4720

"Z" value required for P=0.01.....=0.7086

It appears that, in the absence of ground limestone and potash, dressings of phosphate give a yield increase. In the presence of ground limestone it appears to be wiser to apply either both phosphate and potash or neither of these fertilisers.

During the three crops the broadcasted dressing of ground limestone, given at the rate of ten tons per acre to the plant canes, has produced an increased yield of 1.08 tons of sucrose.

Conclusions :—Under the conditions of the experiment:—

(a) Ground limestone broadcasted at the rate of ten tons per acre at planting has a definite residual effect upon the yield of cane in the second ratoon crop.

(b) Such dressings of ground limestone do not have a residual effect upon the sucrose content of the cane, the juice purity nor on the glucose ratio.

(B5) GROUND LIMESTONE IN THE ROW ON PEGASSY CLAY (PLN. FARM, SECOND RATOONS).

(*Plant cane results reported in Sugar Bull. No. I, pp. 70-73*).

(*First ratoon results reported in Sugar Bull. No. II, pp. 40-42*).

This experiment involves graded dressings of ground limestone, sulphate of ammonia and certain applications of sulphate of potash. The effects of the various dressings of sulphate of ammonia have already been considered (Sub-Section A, Exp. 13).

The nature of the experiment, the character of the soil, the calendar of agricultural operations and the rainfall data have been previously described.

The results of the second ratoon crop are recorded in Table LXXX and are presented graphically in Figure XLV where the yields of the plant cane and first ratoon crops are included for comparison.

TABLE LXXX.

Ground Limestone, Tons/acre	Cane, Tons/acre,		Sucrose in cane, Per cent.,		Sucrose, Tons/acre,	
	Actual.	Per cent.	Actual.	Per cent.	Actual.	Per cent.
Nil	13.29	89.0	15.14	98.4	2.01	87.4
1	14.82	99.3	15.25	99.2	2.26	98.3
4	15.46	103.5	15.50	100.8	2.40	104.3
8	16.15	108.2	15.63	101.6	2.52	109.6
Means	14.93	100.0	15.38	100.0	2.30	100.0
S. E. of treatment means	0.359	2.40	0.094	0.61	0.055	2.39
Significant Differences	1.04	7.0	0.27	1.8	0.16	0.7

"Z" value obtained for effect of limestone on yield of cane.....=1.2219
"Z" value obtained for effect of limestone on sucrose content of cane.....=0.8638
"Z" value required for P=0.01.....=0.7086

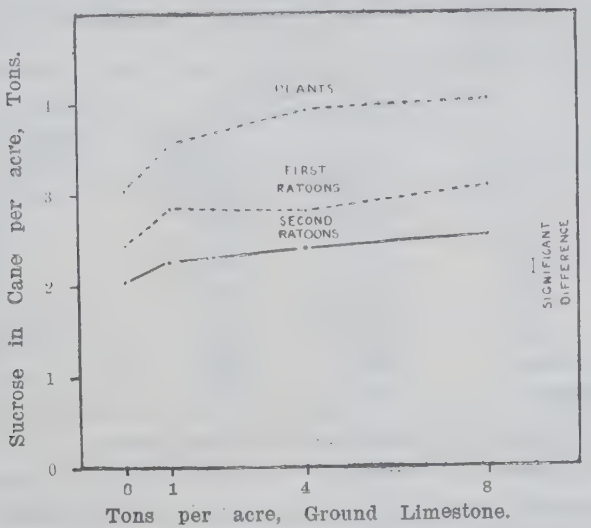

FIG. XLV.

Effect of Ground Limestone on Pegassy Clay (Plant Canes, First and Second Ratoons).

It is apparent that the limestone has had a beneficial residual effect both on the tonnage and on the sucrose content of the cane.

The combined returns for the three crops are shown in Table LXXXI.

TABLE LXXXI.

Ground limestone, Tons/acre.	Sucrose, Tons/acre.
nil	7.48
1	8.65
4	9.12
8	9.64

An application of ground limestone at the rate of one ton per acre in the row at planting has been responsible for an increased yield in three crops of 1.17 tons of sucrose per acre. This is a decidedly remunerative increase. The heavier applications, however, prove uneconomic and this is somewhat surprising when it is remembered that the theoretical lime requirement of the topsoil of this area is 21.1 tons of calcium carbonate per acre-foot.

The dressings of ground limestone had no residual effect upon the juice purity, the average value of which was 91.4.

A definite residual effect on the glucose ratio was noted and the results are appended in Table LXXXII.

TABLE LXXXII.

Ground Limestone, Tons/acre.	Glucose ratio, Actual.	Glucose ratio, Per cent. of mean.
nil	6.39	103.7
1	6.67	108.3
4	5.82	94.5
8	5.75	93.3
Means	6.16	100.0
S. E. of treatment means	0.235	3.81
Significant Differences	0.68	11.0

"Z" value obtained for effect of limestone on glucose ratio.....=0.6404
"Z" value required for P=0.05.....=0.5073

The results indicate that the heavier dressings of ground limestone at planting assisted the ripening of the second ratoon cane.

Conclusions :—Under the conditions of the experiment :—

(a) Applications of ground limestone, in the row at planting, have a beneficial residual effect upon the tonnage, the sucrose content of the cane and on the glucose ratio.

(b) In spite of the fact that the soil of the experimental area possesses a very high theoretical lime requirement, the heavier dressings, at the rates of 8 tons and 4 tons per acre, proved uneconomic.

(c) An application of coarse ground limestone, at the rate of 1 ton per acre in the row at planting, gave a definitely remunerative increase in yield during the three crops.

(B6) Ground Limestone and Slaked Lime in the Row on Pegassy Clay, (Pln. Uitvlugt, First Ratoons).

(Plant cane results reported in Sugar Bull. No. I, pp. 73—76)

This experiment involves graded dressings of ground limestone and slaked lime. The applications were made at planting and the results here reported refer to the possible residual effects upon the first ratoon crop.

The topsoil is a highly acidic pegassy clay overlying a highly acidic clay subsoil. The organic matter content is lower and the carbon : nitrogen ratio is wider than the average for this class of soil. The contents of soluble salts is low.

During the first three months of the growth period the ratoons experienced a dry spell, but for the remainder of the period the rainfall was normally distributed.

The results of analyses of the materials used in this trial have been previously reported.

The yields of the first ratoon crop are presented in Table LXXXIII.

Table LXXXIII.

Fertiliser.	Rate, Tons/acre.	Cane, Tons/acre.	Sucrose, Tons/acre.	Per cent. of mean.
Control	nil	21.84	2.76	100.7
Slaked Lime	1	21.49	2.72	99.1
" "	2	22.90	2.89	105.6
" "	5	21.84	2.76	100.7
Ground Limestone	1	21.75	2.75	100.3
" "	2	21.06	2.66	97.1
" "	5	20.90	2.64	96.4
Means	...	21.68	2.74	100.0
S.E. of treatment means	...	0.745	0.094	3.44
Significant Differences	...	2.19	0.28	10.1

The 'Z' values obtained for the effect of treatment and for the effect of quantity of lime-bearing material and its quality are all negative.

Neither quantity nor quality of liming material appears to have a residual effect upon the yield of the first ratoon crop.

It was not possible to examine cane samples collected from every plot of this experiment, but bulked samples, representative of each treatment, were analysed at Sophia Experiment Station.

The general mean analytical figures were :—

Percentage of sucrose in cane	12.64
Purity	85.0
Glucose ratio	9.26

Conclusions :—Under the conditions of the experiment :—

(a) Dressings of lime-bearing materials up to five tons per acre, applied in the row at planting, have no residual effect on the yield of cane in the first ratoon crop.

SUB-SECTION C.—EXPERIMENTS WITH PHOSPHATIC MANURES.

The field tests with phosphatic fertilisers, so far carried out, have merely formed a part of some more complex experiment and their object has been to investigate the effects of phosphatic manures in the presence and absence of other fertilisers. The results are naturally of more theoretical than practical interest.

When investigations of manurial practice were recommenced, limitations of staff and funds prevented the exploration of any avenues except the more important questions of nitrogen requirements and the need for lime-bearing materials.

Recent soil survey work has indicated that the phosphate problem is of particular interest to the planters of Berbice and of some estates of East Demerara. Recent monetary grants have permitted the establishment of two chains of phosphate experiments. One chain aims at determining the most suitable form of fertiliser while the other chain is designed to assess the most paying quantity to use and the best method of application. The plant cane results of these experiments should be available for publication in the next Bulletin.

(C1) Ground Rock Phosphate on Unflooded Frontland Clay, (Sophia Experiment Station, Plant Canes).

This experiment, which involves graded dressings of ground limestone, has already been considered (Sub-section B, Exp. 3). Other crops from the same experimental area have been discussed in previous publications (*Agr. Jour. B.G.*, IV, 2, pp. 64-68, *Sugar Bull.* I, pp. 76-77). The experiment includes two treatments of ground limestone at the rate of 9 tons per acre, the one without further addition, the other combined with a dressing of ground rock phosphate at the rate of 0.5 ton per acre. These applications were made in February 1930. The present crop was planted in October 1932 and reaped in December 1933. The results here reported are concerned therefore with the possible residual effect of the rock phosphate applied two and a half years earlier.

The yields in sucrose per acre are presented in Table LXXXIV.

TABLE LXXXIV.

Fertiliser.	Sucrose, Tons/acre.
Limestone, 9 tons per acre, and Rock Phosphate, 0.5 ton per acre	1.93
Limestone, 9 tons per acre	1.96

Conclusions :—Under the conditions of the experiment:—

(a) Dressings of rock phosphate made two and a half years earlier have no residual effect upon the yield of cane.

(C2) SUPERPHOSPHATE AND ROCK PHOSPHATE ON UNFLOODED FRONTLAND CLAY (SOPHIA EXPERIMENT STATION, SECOND RATOONS).

(*Plant cane and first ratoon results reported in Sugar Bull. No. I, pp. 76-78*).

This experiment, which involves dressings of other fertilisers, has already been discusssed (Sub-section A, Exp. 7 ; Sub-section B, Exp. 4).

The plots receiving phosphatic manures were divided into half plots and at planting one half plot, chosen at random from each plot, was dressed with superphosphate while the other half plot received an equivalent dressing of ground rock phosphate.

The effects of the residual phosphatic dressings on the yield of sucrose per acre for the second ratoon crop and the total effect for the three crops are shown in Table LXXXV.

TABLE LXXXV.

Fertiliser.	Sucrose, Tons/acre.	
	Second ratoons.	Combined results.
Phosphate (150 lbs. P_2O_5 per acre)	2.00	7.20
No Phosphate	1.91	7.17
S.E. of treatment mean	0.059	...
Significant Difference	0.17	...

The results indicate that the phosphate dressings have had no residual influence on either the tonnage, the sucrose content of the cane, the juice purity nor the glucose ratio. A complicated interaction involving limestone, potash and phosphate has already been noted (page 107).

Further statistical analysis indicates that there is no difference in the residual effects of superphosphate and an equivalent amount of rock phosphate. The results for the second ratoon crop are presented in Table LXXXVI.

TABLE LXXXVI.

Difference in favour of superphosphate	0.02 tons sucrose per acre.
Value of 't'	0.330
'n'	63
'P'	0.8

Conclusions:—Under the conditions of the experiment :—

(a) Heavy dressings of phosphatic manures, applied at planting, have no residual effect in the second ratoon crop on the tonnage, the sucrose content of the cane, the juice purity nor on the glucose ratio.

(b) No difference is to be noted between the residual effects of dressings of superphosphate and equivalent amounts of ground rock phosphate.

(c) The above conclusions apply also to the combined results of the three crops.

(d) A complicated interaction involving phosphate, potash and limestone is noted.

SUB-SECTION D.—EXPERIMENTS WITH POTASSIC MANURES.

The remarks made in the opening paragraph of the sub-section dealing with phosphatic manures apply with even greater force to the question of potash fertilisation.

Recent detailed soil surveys have indicated that the widely distributed frontland soil type usually contains ample supplies of available potash. The pegasse soil type, which comprises approximately 25 per cent. of the Colony's cane lands, is often deficient in supplies of available potash. These soils usually produce inferior yields which are not entirely the result of insufficient supplies of potash. Sulphate of potash is an expensive fertiliser and with the present price of sugar it is doubtful whether applications of potash to the comparatively poor yielding pegasse soils will prove remunerative.

One of the experiments discussed in this section deals with the results of applications of sulphate of potash to a pegassy clay soil. The other experiment is concerned with problems of the residual effect of a heavy dressing of sulphate of potash on the utilisation of sulphate of ammonia by second ratoons in the presence and absence of other fertilisers.

(D1) Sulphate of Potash on Unflooded Frontland Clay, (Sophia Experiment Station, Second Ratoons).

(Plant cane and first ratoon results reported in Sugar Bull. No. I, pp. 78-79).

This experiment, which involves graded applications of sulphate of ammonia to the second ratoons and dressings of ground limestone, superphosphate, ground rock phosphate and sulphate of potash at planting, has already been considered. (Sub-section A, Exp. 7 ; Sub-section B, Exp. 4 ; Sub-section C, Exp. 2).

The conditions of the experiment have been previously described.

The residual effects of the potassic dressings on the yield of the second ratoons are presented in Table LXXXVII together with the combined figures for the three crops.

Table LXXXVII.

Sulphate of Potash, (K_2O lbs. per acre).	Cane, Tons/acre.	Sucrose, Per cent. cane.	Sucrose, Tons/acre.	Combined results, Sucrose, Tons/acre.
nil	14.00	13.76	1.93	7.20
150	14.16	14.04	1.99	7.18
Means	14.08	13.89	1.96	7.19
S.E. of treatment means	0.423	0.085	0.059	...
Significant Differences	1.22	0.25	0.17	...

'Z' value obtained for residual effect of potash on sucrose content of cane = 0.8332
'Z' value obtained for P =0.05 = 0.5073

It will be seen that while the heavy dressings of sulphate of potash at planting have had no effect on the yield of cane in any of the three crops, yet they have had a definite and favourable residual effect upon the sucrose content of the second ratoon cane.

It is evident, too, that the applications of sulphate of potash have had a definite residual effect on the glucose ratio. The results are presented in Table LXXXVIII.

Table LXXXVIII.

Sulphate of Potash, (K_2O lbs. per acre).	Glucose ratio, Actual.	Glucose ratio, Percent of mean.
nil	11.26	106.9
150	9.79	93.0
Means	10.53	100.0
S.E. of treatment means	0.30	2.85
Significant Differences	0.87	8.3

'Z' value obtained for effect of potash on glucose ratio = 1.2389
'Z' value required for P = 0.01 = 0.9784

The dressings of sulphate of potash have produced a number of interactions with the other fertilisers. A second order interaction between limestone, phosphate and potash on yield of cane has been described (page 108). A second order interaction between nitrogen, limestone and potash on the sucrose content of the cane has been recorded (page 189) while a first order interaction between nitrogen and potash on the glucose ratio is also noted (page 91).

Conclusions:—Under the conditions of the experiment :—

(a) Heavy applications of sulphate of potash at planting have had no residual effect on the yield of second ratoon cane.

(b) These dressings have had a beneficial residual effect upon the sucrose content of the second ratoon cane.

(c) A second order interaction between limestone, phosphate and potash as regards the yield of cane is noted.

(d) In the absence of residual ground limestone, residual dressings of potash were necessary to eliminate the undesirable effects of heavy dressings of nitrogen on the sucrose content of the second ratoons. When residual limestone is present the heavier dressings of sulphate of ammonia adversely affect the sucrose content of the cane only when residual potash is present.

(e) Sulphate of potash applied at planting neutralises the adverse effect of heavy dressings of nitrogen on the ripening of the second ratoon crop.

(D2) Sulphate of Potash on Pegassy Clay, (Pln. Farm, Second Ratoons).

This experiment, which involves graded dressings of sulphate of ammonia and of ground limestone, has already been described (Sub-section A. Exp. 13 ; Sub-section B. Exp. 5).

The experiment gives information regarding the effect of an application of sulphate of potash at the rate of 2 cwt. per acre in combination with a small dressing of sulphate of ammonia at different levels of limestone applications.

The character and conditions of the experiment have already been described and it should be noted that this trial concerns the application of potash to all three crops.

The results of the application of sulphate of potash to the second ratoon canes are presented in Table LXXXIX and shown graphically in Figure XLVI.

TABLE LXXXIX.

Sulphate of Potash, Cwt./acre.	Cane, Tons/acre.	Sucrose, Tons/acre.	Per cent. of mean.
nil	14.23	2.19	94.9
2	15.77	2.43	105.1
Means	15.00	2.31	100.0
S.E. of treatment means	0.402	0.618	2.68
Significant Differences	1.16	1.79	7.7

'Z' value obtained for effect of potash on yield of cane = 0.9907
'Z' value required for P = 0.01 = 0.9784

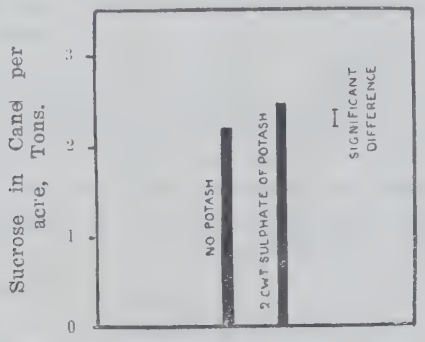

FIG. XLVI.

Effect of Sulphate of Potash on Pegassy Clay (Second Ratoons).

The potassic dressings have had no definite effect on the sucrose content of the cane, on the juice purity nor on the glucose ratio.

The general mean analytical figures are :—

Percentage of sucrose in cane	15.38
Purity	91.4
Glucose ratio	6.16

No interaction between the residual limestone and the dressings of sulphate of potash is noted.

During the course of this experiment 6 cwt. per acre of sulphate of potash has been applied in three dressings to the treated plots. These applications have resulted during the three crops in an increased yield of 0.95 tons of sucrose per acre.

Conclusions :—Under the conditions of the experiment :—

(a) Dressings of sulphate of potash to second ratoons on pegassy clay definitely increased the yield of cane but were without effect upon the sucrose content, the juice purity and the glucose ratio.

(b) *No* definite interaction between the potash and the residual limestone dressings is noted.

SUB-SECTION E.—DISCUSSION AND SUMMARY OF RESULTS.

DISCUSSION.

Before discussing the results of the manurial trials reported in this section it would be as well to consider the inter-relationship between the analyses of soil samples, soil survey work and the execution of manurial trials in the field. In this connection one may quote the recently expressed opinion of Dr. H. J. Page, Controller of the Imperial Chemical Industries Agricultural Research Station, (*Jour. Soc. Chem. Ind.* 52, p. 640).

> "The proper function of soil analysis for the diagnosis of the manurial "requirements of the soil is in connection with a soil survey, associated "with a properly-designed scheme of field experiments. When areas of "similar types of soil have been mapped, and when the actual plant "food requirements of the soil at sufficient centres in any such area have "been ascertained by field experiments and correlated with the result of "the analysis of the soil at these same centres, then it is possible, from "the analysis of soil from anywhere else in that area, to give a pretty "reliable opinion as to the need for nitrogen, phosphoric acid or potash "on that soil for any specified crop."

Any endeavours which may be made to increase crop production by the use of soil amendments or fertilisers should be preceded by soil survey work. A detailed soil survey of a tract of land delineates its main soil types, estimates their distribution, furnishes general information regarding the most probable deficiencies and indicates the plant nutrients which are likely to be present in adequate amounts. A detailed soil survey therefore defines the chief manurial problems of the tract and assists in the choice of suitable areas for field experimentation. A series of well-executed field trials, designed to investigate the problems suggested by the soil survey, will answer the economic questions of the optimum amounts of fertiliser required on different soil types. With these foundations the analysis of soil samples becomes a valuable instrument for the diagnosis of manurial requirements.

When the attention of the Chemical Division turned, in 1930, to the cane soils of the Colony there was no provision for the first essential step—the detailed soil survey. Examination of numerous samples collected from estates during this period emphasised the marked acidity of the topsoils of the clay lands and the high acidity of both the topsoils and subsoils of the cultivated pegasse. The first field experimental work was therefore directed toward the determination of the immediate and residual effects of dressings of lime-bearing materials on the yield of sugar. The main problem gave rise to subsidiary questions which were made the subject of field trial. Thus it was thought that if the acidity of these soils was, to some extent, neutralised the cane might utilise efficiently heavier doses of sulphate of

ammonia. Three trials containing varied treatments of ground limestone and sulphate of ammonia were therefore established, one on flood-fallowed clay in Field 6 Ankerville, Port Mourant, one on unflooded clay in Fields 5, 7 and 8 W., Sophia, and one on pegasse soil in Field 86 G.D., Farm. Another subsidiary problem concerned the choice of the form of lime-bearing material to be used. Until that time slaked lime had been almost exclusively employed when fields were limed. Ground limestone is easier to handle and cheaper to apply and two field trials, the one in field G.V. 21, Pln. Leonora, on flood-fallowed clay soil, and the other on pegasse soil, in Field 75 Zeeburg, Pln. Uitvlugt, were established.

Three crops have been reaped from all except one of these experimental areas and the results, presented in this and in previous Bulletins, are discussed in subsequent paragraphs.

At the same time a number of organic nitrogenous manures such as Kerazotine, Leathermeal and Bacterised Peat, supplied by the makers, have been submitted to field comparison with sulphate of ammonia, the standard nitrogenous fertiliser of the Colony.

During 1931 Messrs. Booker Bros., McConnell & Co. Ltd., placed funds at the disposal of the Department for the detailed soil survey of 35,000 acres of cane land and the first essential step toward the examination of the Colony's sugar-cane fertiliser problems was taken. The soil survey was completed in two years and provided information of value. It indicated that one of the most important problems of cane husbandry in this Colony was the provision of adequate drainage and that the pegasse soil type, the variety and manurial requirements of which had never been seriously investigated, supported a fair proportion of the Colony's cane crop. The distribution of the two main soil types, the frontland clay and the pegasse, was delineated with considerable accuracy and the laboratory examination of composite soil samples indicated the lines of future field experimentation. It confirmed the opinion that the majority of the cane soils possessed a pronounced acidity and it suggested that the two soil types might have differing nitrogen requirements. The phosphate status of the soils was described and showed that there were large tracts of cane land in Berbice where applications of phosphatic manures might be expected to produce a remunerative increase in yield. Limited areas, mainly confined to the pegasse soil type, where the application of potassic manures was likely to result in yield increases, were also delineated.

With the completion of the soil survey it became necessary to establish a number of field experiments designed to give economic data on the problems outlined by the survey. At that time the limited funds of the Sugar Experiment Station precluded the extension of field work with fertilisers. Fortunately grants of financial assistance were made for this purpose by Imperial Chemical Industries, Ltd. and by Messrs. Booker Bros., McConnell & Co., Ltd.

Two chains of latin squares, the one on flooded frontland clay the other on pegasse soil, were immediately established with the view of determining the nitrogen requirements of cane growing on these two soil types. The results of the plant cane crop from these trials are presented in this Bulletin. At a later stage two chains of latin squares, the one concerning the optimum dressing of phosphatic fertiliser, the other involving the application of different types of phosphatic manure, were also established. The results of these trials should be available for inclusion in the next Bulletin. When circumstances permit it is proposed to initiate qualitative and quantitative experiments with potassic fertilisers.

A consideration of the results obtained from three crops on four of the five major liming trials indicates that on flood-fallowed frontland clays (A. 6, Pln. Port Mourant and G.V. 21, Pln. Leonora), with theoretical lime requirements of 3.2 tons and 9.3 tons of ground limestone per acre-foot of topsoil, applications of lime-bearing materials at rates of from 1 ton to 6 tons per acre to the plant canes had no definite immediate effect on yield of plant cane nor any certain residual effect on the yield of the two subsequent crops of ratoons. It seems therefore that applications of this magnitude, made in the row, resulted in no economic yield increases during three crops and from this point of view there appears to be no value in the application of lime-bearing materials to canes growing on flood-fallowed frontland soils. On the other hand, it seems beneficial to make small (10 cwt. to 1 ton per acre) but regular applications of liming materials to these soils so that the progressive change towards soil acidity may be checked. If no steps are taken to prevent this increase in soil acidity the frontland soils may eventually become so acidic that the growth of cane may be markedly diminished. If at any time circumstances should cause this form of insurance to be curtailed then it would be wiser to omit the applications from the soils of the front third of the estate. The experiments further demonstrate that on these soils dressings of liming materials do not affect the utilisation of nitrogen by the cane and that no definite difference is to be expected between the effects of equal quantities of ground limestone and slaked lime.

The results of the two liming experiments on pegasse soil (G.D. 86, Pln. Farm, and 75 Z., Pln. Uitvlugt), with theoretical lime requirements of 21.1 tons and 14.5 tons of ground limestone per acre-foot of topsoil, indicate that in one case (at Pln. Farm) dressings of ground limestone at the rate of 1 ton per acre in the row proved definitely remunerative while heavier dressings up to 8 tons per acre were uneconomic. In the other instance (at Pln. Uitvlugt), where only two crops have been reaped, an application at the rate of 1 ton per acre appears to be as effective as dressings at heavier rates. It has yet to prove itself a remunerative undertaking. It seems therefore that on these pegasse soils, even though they possess high theoretical lime requirements, small applications of the order of one ton per acre are likely to prove more suitable. This problem, however, requires further field experimentation ; in one trial the dressing proves economic while in the other

trial no such proof is yet forthcoming. The Uitvlugt trial further demonstrates that there is no definite difference to be expected between the effects of equal quantities of ground limestone and slaked lime.

It is shown also that in the plant canes the application of ground limestone to a pegasse soil alters the efficiency with which the plant utilise nitrogen. Such effects are not definitely demonstrated in the ratoon crops.

The four liming experiments so far described are of an economic character. The fifth trial, in Fields 5, 7 and 8 W., Sophia, is of theoretical interest. It was laid down on an unflooded frontland clay possessing a theoretical lime requirement of 4.3 tons of ground limestone per acre-foot. The broadcasted dressing of ground limestone at the rate of 10 tons per acre had a definite but uneconomic effect upon the yield of cane. In both first and second ratoon crops the limestone had a residual effect upon the utilisation of nitrogen by the cane. The experiment yields no economic data on the use of limestone on unflooded clay soils but since flood-fallowing has become the recognised procedure the proportion of this type of soil under cane cultivation is small.

The results of the one field trial with varied amounts of sulphate of ammonia on flood-fallowed frontland clay which has been reaped for three crops (A.6, Port Mourant) indicate that 2 cwt. per acre should be used for plant canes, while on succeeding ratoons the application should be increased to 4 cwt. per acre. The results of the plant cane crop of the chain of five latin squares on flooded frontland clay confirm the opinion that 2 cwt. per acre is the optimum dressing for plant canes on this type of soil.

The results of the only field trial with varied amounts of sulphate of ammonia on pegasse soil which has been reaped for three crops (G.D. 86, Pln. Farm) confirm the suggestions, derived from laboratory examination of the soils, that pegasses are likely to differ from frontland clays in their nitrogen requirements. On the plant canes 6 cwt. per acre gave the heaviest yield while on the subsequent ratoons a dressing of 4 cwt. per acre was responsible for the highest yields. The economic success of these applications depends on the relative prices of sugar and fertiliser. These suggestions are of a tentative nature being based on the results of one field experiment. The plant cane results of three of the chain of six latin squares on pegasse soil are presented in this Bulletin. It is unfortunate that circumstances did not permit the collection of results from all six of these trials and that three of them have required re-establishment in other fields with consequent delay in the accumulation of data. While the results so far obtained suggest that heavy dressings of sulphate of ammonia are desirable there are not yet enough records available to permit of counselling such a revolutionary practice.

The results of the second ratoon trial with varied amounts of sulphate of ammonia on unflooded frontland clay indicate that while heavy dressings give

higher yields yet an application at the rate of 1.7 cwt. per acre is likely to be the most profitable.

Subsidiary experiments with sulphate of ammonia, the one designed to test whether heavy dressings have a residual effect upon subsequent crops, the other concerned with the effects of an organic nitrogenous manure, Bacterised Peat, have been reaped as first ratoons. The former indicates that dressings at the rate of 3 cwt. and 6 cwt. per acre to plant canes have no definite effect upon the ratoon crops, a finding of importance in connection with other trials. The experiment with Bacterised Peat shows that higher yields can be obtained at lower cost by the use of artificial fertilisers.

Two trials concerning phosphatic manures on unflooded frontland clay have been reaped but in neither case has the fertiliser exerted any beneficial effect. The soil survey work recently concluded has indicated the existence of considerable tracts of land where the phosphate question is likely to be of particular interest. Two chains of field trials have accordingly been established. One chain includes varied treatments of superphosphate. Two of the treatments (3 cwt. and 6 cwt. per acre) are being applied to the plant canes only, while two other treatments (2 cwt. and 4 cwt. per acre) are being given to plants and to ratoons. The other chain includes dressings of different phosphatic fertilisers such as superphosphate, basic slag, Preciphos and Niciphos and should yield information regarding the most suitable form to apply. The plant cane results of these trials should be available for publication in the next Bulletin.

Two trials with sulphate of potash have been carried out. One trial on unflooded frontland clay is concerned with the immediate and residual effects of a heavy dressing of sulphate of potash given at planting. This application has had no definite effect on the yield of sucrose. It has, however, had a residual effect on the juice characteristics to be discussed in later paragraphs. The other trial is concerned with the application of dressings at the rate of 2 cwt. per acre to plants and ratoons growing on a pegasse soil of low potash content. Although definite yield increases have been obtained yet it is doubtful whether the application of expensive potassic manures to the comparatively poor-yielding pegasse will prove remunerative with the present price of sugar. When circumstances permit, other field trials with potassic manures on pegasse soils and on the second ratoons of cane growing on frontland clays should prove of interest.

The manurial experiments carried out since the re-organisation of the Department have been supported by the analysis of samples of cane from the individual plots and the effects of certain fertilisers on the sucrose content of the cane and on the quality of the juice have been noticed. These effects are discussed in the following paragraphs.

It is apparent that the heavier dressings of sulphate of ammonia applied to canes growing on frontland clay, whether flood-fallowed or unflooded, may adversely affect the sucrose content, the juice purity and the glucose ratio of the crop. Such effects have not been noticed with cane growing on pegasse soil. Results obtained with the second ratoon crop of an experiment on unflooded frontland clay indicate that heavy applications of limestone or of sulphate of potash, applied to the plant canes, have the residual property of nullifying the adverse effect of heavy applications of sulphate of ammonia on the sucrose content of the cane and on the glucose ratio of the juice. It is for this reason that it would be interesting to observe the results of applications of sulphate of potash to second ratoons growing on soils possessing low contents of exchangeable potash.

Dressings of ground limestone have had no effect on the quality of the cane on flood-fallowed frontland clays. On unflooded clays, dressings of ground limestone may adversely affect the juice purity and the glucose ratio. On pegasse soils, dressings of limestone may improve the sucrose content of the cane, the juice purity and the glucose ratio.

Dressings of sulphate of potash may, on pegasse soils, improve the sucrose content of the cane and the juice purity. On unflooded frontland clays it has improved the glucose ratio.

SUMMARY.

The preceding paragraphs present a review of the circumstances which led to the establishment of the fertiliser trials which have engaged the attention of the Department.

It is impossible at this stage to make final pronouncements regarding the optimum fertiliser practice, for sufficient data have not yet accumulated. The present position may, however, be tentatively defined.

Sulphate of Ammonia.

For plant canes on *flooded frontland* soil it is fairly well established that generally the optimum dressing for the standard cane is at the rate of 2 cwt. per acre. For the first and second ratoon crops applications at the rate of 4 cwt. per acre are probably the most suitable.

For plant canes on *unflooded frontland* soil it is probable that an application at the rate of 3 cwt. per acre is generally desirable, though one experiment with Diamond 10 has indicated that this cane is capable of utilising heavier dressings. For first ratoon crops $3\frac{1}{2}$ cwt. per acre appears to be suitable while for second ratoon crops it is probable that $1\frac{3}{4}$ cwt.—2 cwt. per acre is likely to prove more economic.

It had been hoped that this Bulletin would have contained authoritative statements regarding the nitrogen requirements of plant canes on *pegasse soils*. Circumstances have precluded the reaping of all of the trials concerned with this problem. Indications that heavier dressings of sulphate of ammonia might prove suitable have been obtained, but there are not sufficient data available to permit the suggestion of any radical change in manurial practice.

Lime-Bearing Materials.

On *flooded frontland* soil applications of lime-bearing materials appear to have little or no effect during three crops upon the yield of cane. Small applications of the order of $\frac{1}{2}-1$ ton per acre should prove a form of insurance against the tendency towards increased acidity which these soils possess.

In the few experiments with lime-bearing materials on *unflooded frontland* soils applications have had an undoubted effect upon yield but it is unlikely that the increases obtained have proved remunerative.

On *pegasse* soils applications of liming materials at the rate of 1 ton per acre have had a definite effect on the yield. In one experiment the dressing proved profitable, while in the other trial its economic success has yet to be established. This problem is worthy of more extended field investigation.

There is no evidence that either ground limestone or slaked lime is to be preferred as a source of lime.

Phosphatic Manures.

Until recently our field experiments have not been directed towards the investigation of the most suitable dressing of phosphatic fertiliser. Present practice varies considerably on a number of estates. Critical experiments designed to discover not only the best source but also the economic rate and the best method of its application are in progress.

Potassic Manures.

One experiment on *unflooded frontland* soil indicated that a heavy application of sulphate of potash at planting had no immediate or residual effect on the yield of sucrose.

One experiment on *pegasse soil* indicated that applications of 2 cwt. per acre of sulphate of potash resulted in definite yield increases, but it is doubtful whether such a practice would prove remunerative under present market conditions.

DRAINAGE TRIALS.

The second ratoons of two drainage trials in Field 9 West, Sophia, were reaped on 15th November when they were $11\frac{1}{2}$ months old. The trials were fully described and the plant cane and first ratoon results presented in *Sugar Bulletin* No. I, pp. 85 *et seq.*

The yields of sucrose in cane per acre from the second ratoons of Latin Square I, together with the total yields for three crops, are shown in Figure XLVII, while the corresponding data for Latin Square II, are shown in Figure XLVIII.

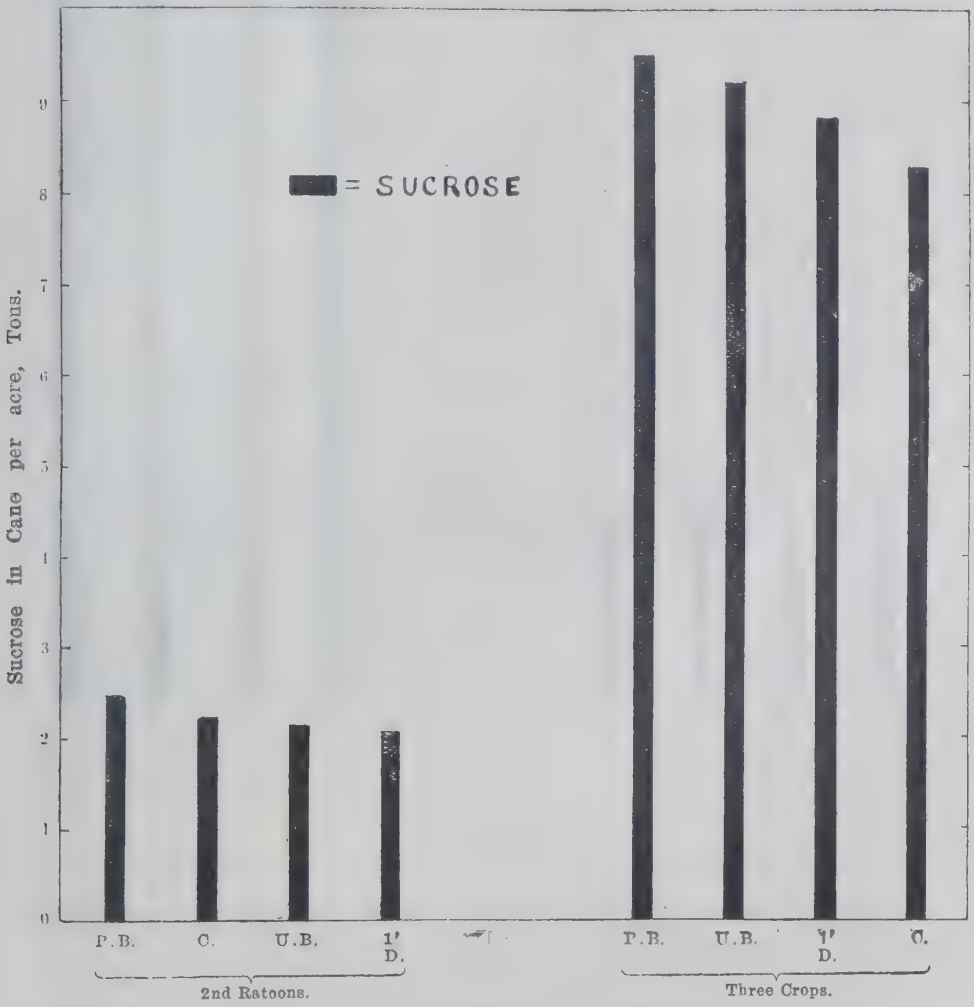

FIG. XLVII.

Yields of Sucrose from Field 9 W., Sophia (Latin Square I).

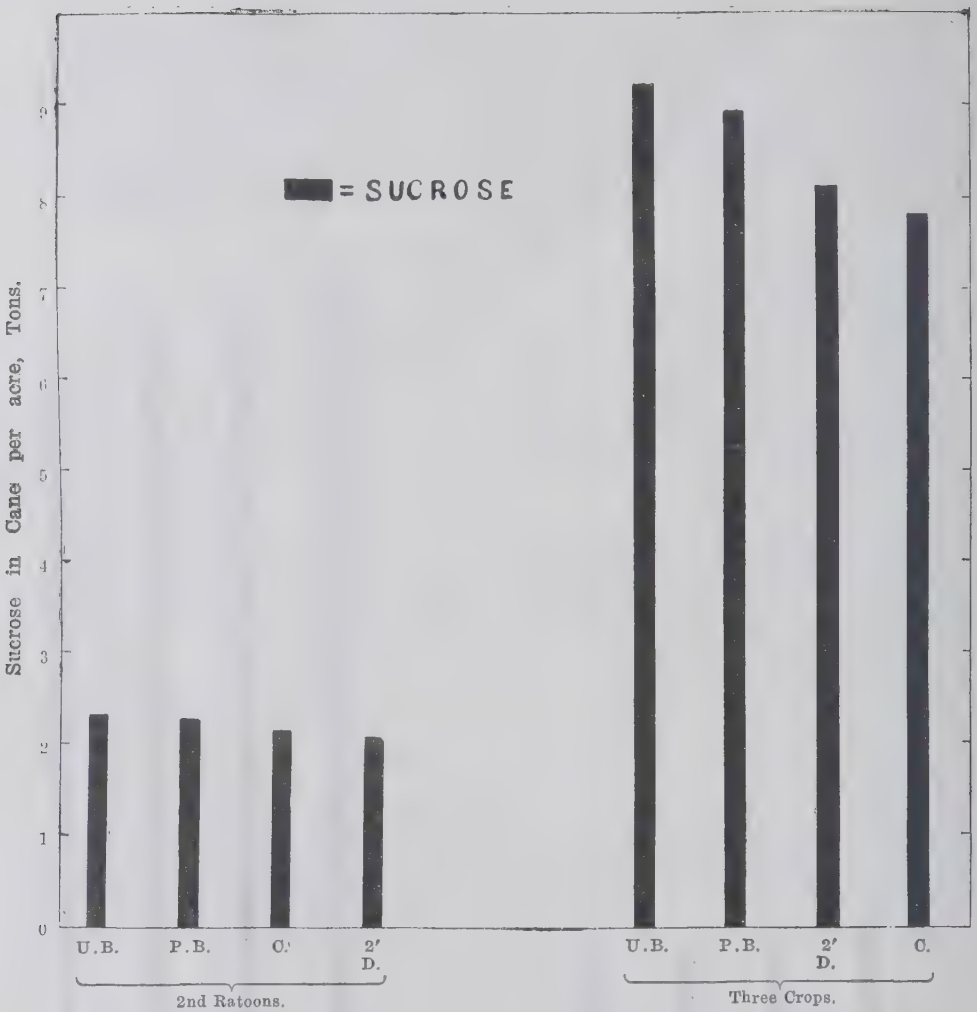

FIG. XLVIII.

Yields of Sucrose from Field 9 W., Sophia (Latin Square II).

Except for a difference in the depth of the bed drills, the two experiments were identical and their results are combined in Table XC.

TABLE XC.

BAMBOO DRAINAGE. SECOND RATOONS, FIELD 9 WEST, SOPHIA.

	Drills.	Controls.	Unpierced Bamboos.	Pierced Bamboos.	Mean.
Sucrose per acre, Tons :	2.07	2.18	2.22	2.36	2.21
Per Cent.	93.67	98.64	100.45	106.79	100.00

Analysis of the results indicates that the differences are not statistically significant. The general trend of the yields is, however, the same as in the plant canes and first ratoons.

Table XCI shows the combined results of the two experiments over a cycle of three crops, viz.: plant canes, first and second ratoons.

TABLE XCI.

BAMBOO DRAINAGE. COMBINED RESULTS OF THREE CROPS, FIELD 9 W., SOPHIA.

	Controls.	Drills.	Unpierced Bamboos.	Pierced Bamboos.	Mean.
Sucrose per acre, Tons :	8.07	8.48	9.21	9.23	8.75
Per Cent.	92.2	96.9	105.3	105.5	100.00

No more drainage trials are being carried out for the moment, but these and the preliminary trial in Field 4 W., Sophia, already reported, seem to leave no doubt as to the advantages of improved drainage. The problem of providing such improvement cheaply, however, remains to be solved.

APPENDIX I.—RAINFALL DATA.

Rainfall at Sophia Experiment Station.

MONTH.		Rainfall 1932–1934 inches.	Average Rainfall 1921–1933 inches.	Excess or Deficit during Growth of the Various Experiments. Field 1 East.	Field 1 West.	Fields 2 and 10 West.	Fields 3, 14 and 15 West.	Fields 5 and 6 East.	Fields 5, 7 & 8 West.	Field 12 West.	Fields 4 & 14 East and 9 West.	Field 11 West.	Field 16 West.	Field 10 East.	Fields 2, 8 & 9 East.
April	1932	15.31	5.08	+10.23											
May	...	13.33	12.01	+1.32											
June	...	14.94	14.50	+0.44	+0.44										
July	...	7.10	10.67	−3.57	−3.57										
August	...	6.84	8.63	−1.79	−1.79	−1.79	−1.79								
September	...	0.45	2.72	−2.27	−2.27	−2.27	−2.27	−2.27							
October	..	3.89	3.88	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01						
November	...	0.09	6.08	−5.99	−5.99	−5.99	−5.99	−5.99	−5.99	−5.99					
December	...	16.40	15.48	+0.92	+0.92	+0.92	+0.92	+0.92	+0.92	+0.92	+0.92	+0.92			
January	1933	7.56	7.29	+0.27	+0.27	+0.27	+0.27	+0.27	+0.27	+0.27	+0.27	+0.27			
February	...	4.77	3.62	+1.15	+1.15	+1.15	+1.15	+1.15	+1.15	+1.15	+1.15	+1.15	+1.15		
March	...	5.43	4.08	+1.35	+1.35	+1.35	+1.35	+1.35	+1.35	+1.35	+1.35	+1.35	+1.35	+1.35	
April	...	5.36	5.08	+0.28	+0.28	+0.28	+0.28	+0.28	+0.28	+0.28	+0.28	+0.28	+0.28	+0.28	
May	...	14.46	12.01	+2.45	+2.45	+2.45	+2.45	+2.45	+2.45	+2.45	+2.45	+2.45	+2.45	+2.45	+2.45
June	...	12.39	14.50	−2.11	−2.11	−2.11	−2.11	−2.11	−2.11	−2.11	−2.11	−2.11	−2.11	−2.11	−2.11
July	...	9.06	10.67	−1.61	−1.61	−1.61	−1.61	−1.61	−1.61	−1.61	−1.61	−1.61	−1.61	−1.61	−1.61
August	...	13.43	8.63	+4.80	+4.80	+4.80	+4.80	+4.80	+4.80	+4.80	+4.80	+4.80	+4.80	+4.80	+4.80
September	...	1.12	2.72	+5.88	−5.67	−1.60	−1.60	−0.75	−1.60	−1.60	−1.60	−1.60	−1.60	−1.60	−1.60
October	...	3.41	3.88			−4.14	−0.47		−0.47	−0.47	−0.47	−0.47	−0.47	−0.47	−0.47
November	...	10.25	6.08				+4.17		−0.55	+4.17	+4.17	+4.17	+4.17	+4.17	+4.17
December	...	28.09	15.48				−0.44			+3.61	+9.60	+12.61	+12.61	+12.61	+12.61
January	1934	29.71	7.29									+22.42	+22.42	+22.42	+22.42
February	...	1.31	3.62									−2.31	−2.31	−2.31	−2.31
March	...	3.42	4.08									−0.66	−0.66	−0.66	−0.66
												+41.66	+40.47	+39.32	+37.69

Rainfall at Plantation Port Mourant.

Month		Rainfall 1932—1934	Average Rainfall 1911—1933	Excess or Deficit during Growth of the Various Experiments. Fields R 6 and A 8	Field H.E. 4.	Field A.E. 28	Field A 6	Field A.O.L. 14	Field A.O.L. 15
September	1932	2.73	2.08	+0.65					
October		1.78	2.48	−0.70					
November		0.26	3.51	−3.25					
December		9.15	8.94	+0.21					
January	1933	6.01	6.91	−0.90	− 0.90				
February		4.32	4.65	−0.33	− 0.33	− 0.33			
March		5.80	3.62	+2.18	+ 2.18	+ 2.18	+ 2.18		
April		3.90	4.78	−0.88	− 0.88	− 0.88	− 0.88	− 0.88	
May		12.30	8.90	+ 3.40	+ 3.40	+ 3.40	+ 3.40	+ 3.40	
June		11.87	9.52	+ 2.35	+ 2.35	+ 2.35	+ 2.35	+ 2.35	+ 2.35
July		7.49	8.77	−1.28	− 1.28	− 1.28	− 1.28	− 1.28	− 1.28
August		11.04	5.10	+ 5.94	+ 5.94	+ 5.94	+ 5.94	+ 5.94	+ 5.94
September		3.29	2.08	+1.21	+ 1.21	+ 1.21	+ 1.21	+ 1.21	+ 1.21
October		1.66	2.48	+8.60	− 0.82	− 0.82	− 0.82	− 0.82	− 0.82
November		9.09	3.51		+ 5.58	+ 5.58	+ 5.58	+ 5.58	+ 5.58
December		29.50	8.94		+20.56	+20.56	+20.56	+20.56	+20.56
January	1934	7.19	6.91		+ 0.28	+ 0.28	+ 0.28	+ 0.28	+ 0.28
February		1.42	4.65		− 3.23	− 3.23	− 3.23	− 3.23	− 3.23
March		3.04	3.62		+34.06	− 0.58	− 0.58	− 0.58	− 0.58
April		1.41	4.78			+34.38	+34.71	+32.53	− 3.37
									+26.64

Rainfall at Plantation Rose Hall.

Month.		Rainfall 1933—1934, Inches.	Average Rainfall 1916—1933, Inches.	Excess or Deficit during Growth of the various Experiments. Field 30 R.H.
February	1933	5.35	5.09	+ 0.26
March		5.51	5.36	+ 0.15
April		4.39	5.15	− 0.76
May		13.40	10.06	+ 3.34
June		10.00	11.21	− 1.21
July		9.92	10.28	− 0.36
August		11.18	6.43	+ 4.75
September		1.08	2.58	− 1.50
October		6.80	2.73	+ 4.07
November		9.82	3.80	+ 6.02
December		27.68	11.10	+16.58
January	1934	9.03	8.22	+ 0.81
February		0.48	5.09	− 4.61
				+27.54

RAINFALL AT PLANTATION BLAIRMONT.

Month.	Rainfall 1932—1933, Inches.	Average Rainfall 1911—1933, Inches.	Excess or Deficit during Growth of the various Experiments.		
			Field 4 H.P.	Field 18 R.	Field 11 R.
June 1932	11.78	12.46	−0.68		
July	7.33	10.19	−2.86		
August	6.83	6.64	+0.19		
September	2.18	2.18	0.00	———	
October	1.94	2.52	−0.58	−0.58	———
November	0.03	3.72	−3.69	−3.69	−3.69
December	10.51	10.65	−0.14	−0.14	−0.14
January 1933	7.68	8.81	−1.13	−1.13	−1.13
February	5.74	4.89	+0.85	+0.85	+0.85
March	5.08	4.65	+0.43	+0.43	+0.43
April	3.36	5.72	−2.36	−2.36	−2.36
May	13.84	10.69	+3.15	+3.15	+3.15
June	16.97	12.46	+4.51	+4.51	+4.51
July	9.34	10.19	−0.85	−0.85	−0.85
August	11.34	6.64	+4.70	+4.70	+4.70
September	0.97	2.18	−1.21	−1.21	−1.21
October	2.87	2.52	+0.35	+0.35	+0.35
November	7.49	3.72	+3.77	+4.03	+4.61
			+4.45		

RAINFALL AT PLANTATION ENMORE.

Month.		Rainfall 1932—1934, Inches.	Average Rainfall 1913—1934, Inches.	Excess or Deficit during Growth of the various Experiments.
				Field 8 B.A.
December	1932	15.92	11.64	+ 4.28
January	1933	5.88	7.70	− 1.82
February		3.40	4.01	− 0.61
March		7.07	4.00	+ 3.07
April		8.41	5.49	+ 2.92
May		11.21	11.35	− 0.14
June		13.57	11.81	+ 1.76
July		7.41	8.96	− 1.55
August		9.01	6.41	+ 2.60
September		0.56	2.30	− 1.74
October		2.92	2.93	− 0.01
November		14.34	6.05	+ 8.29
December		28.19	11.64	+16.55
January	1934	25.08	7.70	+17.38
February		2.21	4.01	− 1.80
				+49.18

RAINFALL AT PLANTATION NON PAREIL.

Month.		Rainfall 1932—1933, Inches.	Average Rainfall 1916—1933, Inches.	Excess or Deficit during Growth of the various Experiments.	
				Field 59 E.	Field 14 E.
August	1932	8.27	7.79	+0.48	
September		0.15	2.89	−2.74	
October		0.99	3.05	−2.06	
November		1.13	6.65	−5.52	
December		16.34	13.25	+3.09	+3.09
January	1933	8.05	8.62	−0.57	−0.57
February		3.24	3.98	−0.74	−0.74
March		6.05	4.35	+1.70	+1.70
April		8.63	5.80	+2.83	+2.83
May		12.19	12.38	−0.19	−0.19
June		15.77	13.55	+2.22	+2.22
July		7.37	10.17	−2.80	−2.80
August		12.18	7.79	+4.39	+4.39
September		1.26	2.89	−1.63	−1.63
October		3.31	3.05	+0.26	+0.26
November		16.97	6.65	−1.28	+10.32
December		29.42	13.25		+16.17
					+35.05

RAINFALL AT PLANTATION LUSIGNAN.

Month.		Rainfall 1932-1934, Inches.	Average Rainfall 1917—1933, Inches.	Excess or Deficit during Growth of the various Experiments.			
				Field 22 B.M.R.	Field 19 E.	Fields 28 E.G.H. & 4 Emp.	Field 38 A.
September	1932	0.11	2.20	−2.09			
October		1.98	3.05	−1.07	−1.07		
November		0.54	5.78	−5.24	−5.24		
December		15.26	12.14	+3.12	+3.12		
January	1933	7.20	8.51	−1.31	−1.31	−1.31	
February		4.30	4.01	+0.29	+0.29	+0.29	
March		6.08	3.97	+2.11	+2.11	+2.11	
April		8.41	5.37	+3.04	+3.04	+3.04	+3.04
May		16.65	11.72	+4.93	+4.93	+4.93	+4.93
June		16.30	13.15	+3.15	+3.15	+3.15	+3.15
July		8.66	9.46	−0.80	−0.80	−0.80	−0.80
August		13.14	6.49	+6.65	+6.55	+6.65	+6.65
September		1.35	2.20	+12.78	−0.85	−0.85	−0.85
October		1.56	3.05		+14.02	−1.49	−1.49
November		18.57	5.78			+12.79	+12.79
December		26.32	12.14			+14.18	+14.18
January	1934	28.99	8.51			+20.48	+20.48
February		1.88	4.01			−2.13	+62.08
						+61.04	

RAINFALL AT PLANTATION OGLE.

Month.		Rainfall 1932—1933, Inches.	Average Rainfall 1906—1933, Inches.	Excess or Deficit during Growth of the various Experiments.
				Field 61 O.
September	1932	0.45	2.20	− 1.75
October		2.57	3.30	− 0.73
November		0.33	5.27	− 4.94
December		15.90	10.97	+ 4.93
January	1933	6.65	7.13	− 0.48
February		4.76	4.47	+ 0.29
March		6.39	5.32	+ 1.07
April		6.85	5.70	+ 1.15
May		13.50	11.44	+ 2.06
June		13.74	10.97	+ 2.77
July		6.56	9.68	− 3.12
August		16.80	7.11	+ 9.69
September		1.72	2.20	− 0.48
				+10.46

RAINFALL AT PLANTATION FARM.

Month.		Rainfall 1933—1934, Inches.	Average Rainfall 1906—1933, Inches.	Excess or Deficit during Growth of the various Experiments.
				Field 86 G.D.
May	1933	14.03	13.58	+ 0.45
June		10.70	14.19	− 3.49
July		5.83	11.68	− 5.85
August		13.82	8.79	+ 5.03
September		1.57	3.62	− 2.05
October		3.96	3.61	+ 0.35
November		13.44	6.17	+ 7.27
December		27.03	12.48	+ 14.55
January	1934	32.50	8.37	+ 24.13
February		2.15	5.25	− 3.10
March		3.39	6.76	− 3.37
April		1.59	7.18	− 5.59
				+28.33

RAINFALL AT PLANTATION DIAMOND.

Month.		Rainfall 1932—1933, Inches.	Average Rainfall 1911—1933, Inches.	Excess of Deficit during Growth of the various Experiments
				Field 53 G.D. & 89 G.D.
October	1932	2.28	4.21	−1.93
November		0.57	6.27	−5.70
December		13.95	12.95	+1.00
January	1933	6.46	8.85	−2.39
February		4.90	5.03	−0.13
March		6.49	5.17	+1.32
April		10.10	6.12	+3.98
May		13.70	14.05	−0.35
June		10.37	14.07	−3.70
July		6.78	11.69	−4.91
August		11.35	8.19	+3.16
September		1.00	3.67	−2.67
October		9.19	4.21	+4.98
				−7.34

RAINFALL AT PLANTATION WALES.

Month.		Rainfall 1933—1934, Inches.	Average Rainfall 1906—1933, Inches.	Excess or Deficit during Growth of the various Experiments.
				Field 4 B. V.
April	1933	7.37	7.08	+ 0.29
May		16.07	14.31	+ 1.76
June		15.76	14.28	+ 1.48
July		8.76	11.61	− 2.85
August		11.73	8.34	+ 3.39
September		2.35	3.70	− 1.35
October		10.34	3.98	+ 6.36
November		13.58	6.45	+ 7.13
December		25.10	13.05	+12.05
January	1934	26.73	8.95	+17.78
February		1.63	5.31	− 3.68
March		3.96	7.10	− 3.14
				+39.22

RAINFALL AT PLANTATION VERSAILLES.

Month.		Rainfall 1933—1934, Inches.	Average Rainfall 1916—1933, Inches.	Excess or Deficit during Growth of the various Experiments. Field 31 R.D.Z.
February	1933	3.78	3.60	+ 0.18
March		4.88	4.73	+ 0.15
April		6.18	4.95	+ 1.23
May		12.67	11.40	+ 1.27
June		13.19	13.26	− 0.07
July		6.04	10.20	− 4.16
August		11.87	8.21	+ 3.66
September		1.82	3.10	− 1.28
October		3.63	2.87	+ 0.76
November		11.61	6.21	+ 5.40
December		21.27	12.89	+ 8.38
January	1934	25.42	7.80	+17.62
February		1.53	3.60	− 2.07
March		3.34	4.73	− 1.39
				+29.68

RAINFALL AT PLANTATION LEONORA.

Month.		Rainfall 1933—1934, Inches.	Average Rainfall 1906—1933, Inches.	Excess or Deficit during Growth of the various Experiments. Field 21 G.V.
May	1933	14.15	13.31	+ 0.84
June		15.58	12.61	+ 2.97
July		7.71	10.95	− 3.24
August		8.35	7.22	+ 1.13
September		1.22	2.88	− 1.66
October		7.23	3.41	+ 3.82
November		14.85	6.54	+ 8.31
December		19.89	11.92	+ 7.97
January	1934	33.08	8.56	+ 24.52
February		1.65	5.00	− 3.35
March		1.96	5.43	− 3.47
April		3.07	5.57	− 2.50
				+ 35.34

RAINFALL AT PLANTATION UITVLUGT.

Month.	Rainfall 1932--1934, Inches.	Average Rainfall 1916--1933, Inches.	Excess or Deficit during Growth of the various Experiments.			
			Field 13 E.	Fields 10 Z. and 75 Z.	Field 94 M.Z.	Field 14 Z.
August 1932	6.45	8.04	—1.59	———		
September	1.35	3.39	—2.04	—2.04		
October	1.44	4.21	—2.77	—2.77	———	
November	1.14	7.72	—6.58	—6.58	—6.58	
December	12.74	14.20	—1.46	—1.46	—1.46	
January 1933	7.36	8.75	—1.39	—1.39	—1.39	
February	5.92	4.22	+1.70	+1.70	+1.70	———
March	6.92	4.80	+2.12	+2.12	+2.12	+2.12
April	5.45	5.83	—0.38	—0.38	—0.38	—0.38
May	14.90	13.78	+1.12	+1.12	+1.12	+1.12
June	18.35	14.30	+4.05	+4.05	+4.05	+4.05
July	9.35	11.82	—2.47	—2.47	—2.47	—2.47
August	10.54	8.04	+2.50	+2.50	+2.50	+2.50
September	1.44	3.39	—1.95	—5.60	—1.95	—1.95
October	10.62	4.21	+6.41		+6.41	+6.41
November	14.60	7.72	—2.73		+6.88	+6.88
December	23.32	14.20			+7.15	+9.12
January 1934	34.50	8.75				+25.75
February	2.36	4.22				—1.86
						+51.29

APPENDIX II.

(*a*) Soils of Variety Trial Sites.

Plantation :—	Sophia Sugar Experiment Station.									
Field No. :—	1 W.		2 W.		3 W.		10 W.		11 W.	
Sample :—	D.794	D.795	D.799	D.800	D.801	D.802	D.803	D.804	D.790	D.791
Sampling depth :—	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.
Normal pH	5.79	6.84	5.42	6.14	5.27	5.40	5.92	6.58	5.94	6.99
Exchange pH	4.41	5.54	4.29	5.03	4.09	4.46	4.66	5.81	4.49	5.81
M.P.S.	50.1	54.5	50.3	57.2	49.8	50.9	48.3	51.8	49.0	49.9
% Sand	2.4	2.9	2.4	1.3	3.3	3.8	3.6	3.3	2.3	2.2
Index of texture	50	54	50	57	49	50	48	51	49	50
% Soluble salts	0.041	0.055	0.041	0.024	0.048	0.158	0.048	0.146	0.037	0.130
% Organic matter	1.51	0.82	1.64	0.81	1.30	0.73	1.45	0.82	1.20	0.84
% Nitrogen	0.133	0.097	0.147	0.085	0.125	0.091	0.124	0.094	0.108	0.096
Carbon/nitrogen ratio	6.58	4.93	6.48	5.51	6.03	4.64	6.77	5.04	6.45	5.07
Rate of solution	4	250	79	15	23	3	39	63	32	54
Lime requirement ton/acre $CaCO_3$	4.5	1.6	4.9	2.7	6.0	3.6	3.6	1.3	3.5	1.4

(a) Soils of Variety Trial Sites.

Plantation :—	Sophia Sugar Experiment Station.									
Field No. :—	14 W.		15 W.		16 W.		1 E.		4 E.	
Sample :—	D.792	D.793	D.788	D.789	D.784	D 785	D.652	D.653	D.722	D.723
Sample depth :—	0—1ft.	1—2ft.	0—1ft.	1—2ft.	0—1ft.	1—2ft.	0—1ft.	1—2ft.	0—1ft.	1—2ft.
Normal pH	5.89	7.49	6.04	7.32	6.15	7.98	5.99	6.07	5.52	6.75
Exchange pH	4.49	6.21	4.70	6.01	4.75	6.36	5.36	5 42	4.31	5.59
M.P.S.	46.0	39.3	38.7	40.0	43.1	45.6	44.7	45.2	50.3	55.4
% Sand	12.5	23.7	25.4	26.7	15.8	16.0	2.3	2.6	2.5	1.7
Index of texture	44	35	34	35	40	43	44	45	50	55
% Soluble Salts	0.051	0.129	0.024	0.077	0.044	0.077	0.289	0 439	0.098	0.240
% Organic matter	1.25	0.51	1.48	0.72	1.05	0.50	1.48	1.19	1.60	0.68
% Nitrogen	0.113	0.062	0.124	0.075	0.10 5	0.072	0.124	0 063	0.126	0.079
Carbon/nitrogen ratio	6.42	4.76	6.90	5.55	5.80	4.00	6.93	10.98	7.35	5.03
Rate of Solution	38	68	154	94	170	83			2	22
Lime requirement ton/acre $CaCo_3$	3.7	0.2	3.1	0.6	2.5	0.2	1.7	1.4	3.48	1.16

(*a*) Soils of Variety Trial Sites.

Plantation :—	Sophia Sugar Experiment Station.					
Field No. :—	5 E.		6 E.		14 E.	
Sample :—	D. 724	D. 725	D. 726	D. 727	D. 786	D. 787
Sampling Depth. :—	0—1 ft.	1—2ft.	0—1 ft	1—2ft.	0—1 ft.	1—2 ft.
Normal pH	5.35	5.47	5.34	5.86	6.08	6.86
Exchange pH	4.12	4.61	4.16	4.88	4.49	5.66
M.P.S.	52.2	53.8	54.3	56.1	40.3	41.6
% Sand	2.4	2 6	3.3	2.5	21.9	23.9
Index of texture	52	53	54	56	36	37
% Soluble Salts	0.075	0.273	0.066	0.235	0.30	0.121
% Organic matter	1.78	0 91	2.31	0.79	1.58	0.77
% Nitrogen	0.136	0.092	0.155	0.087	0.111	0.076
Carbon Nitrogen ratio	7.58	5.77	8.64	5,36	8.27	5,85
Rate of solution	11	8	2	62	39	59
Lime reqt. tom/acre $CaCO_3$	4.32	2.54	4.41	1.94	3.4	1.8

(*a*) Soils of Variety Trial Sites.

Plantation :—	Plantation Blairmont.						Plantation Lusignan.			
Field No. :—	11. R.		18. R.		4. H.P.		22. B.M.R.		19. E.	
Sample :—	B.31	B.32	B.48	B.49	B.98	B.99	D.529	D.530	D.260	D.261
Sampling depth :—	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.
Normal pH	5.52	5.40	4.81	4.62	4.95	5.44	5.5	6.7	5.50	5.37
Exchange pH	4.73	4.83	3.58	3.58	3.78	4.01	4.4	5.4	4.32	4.33
M P.S.	48.4	48.2	42.7	48.7	56.1	50.1	41.6	46.7	44.4	42.5
% Sand	13.5	8.5	10.2	7.8	7.7	2.6	2.8	7.0	5.5	9.2
Index of Texture	46	47	41	47	55	50	41	45	43	41
% Soluble Salts	0.116	0.250	0.027	0.034	0.028	0.033	0.076	0.184	0.045	0.184
% Organic matter	1.18	0.79	1.73	1.46	6.11	1.69	1.64	...	1.60	0.85
% Nitrogen	0.130	0.114	0.134	0.120	0.337	0.128	0.116	...	0.134	0.085
Carbon/Nitrogen ratio	5.27	4.05	7.52	7.07	10.52	7.66	8,2	...	6.94	5.81
Rate of Solution	63	18	34	17	24	11	48	27	205	5
Lime requirement ton/acre $CaCO_3$	4.9	4.3	10.7	12.4	9.11	4.11	5.2	...	6.7	5.0

(*a*) Soils of Variety Trial Sites.

Plantation :—	Plantation Port Mourant.								Planatation Ogle.	
Field No. :—	6 Resource.		8. A.		15 A.O.L.		28. A.E.		61. 0.	
Sample :—	B.29	B.30	B.50	B.51	B.139	B.140	B.116	B.117	D.672	D.673
Sampling depth :—	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.
Normal pH	5.73	6.63	5.72	5.64	6.01	6.01	5.90	6.59	5.24	5.06
Exchange pH	4.67	6.07	5.05	4.81	4.97	5.27	4.78	5.34	3.89	4.00
M.P.S.	51.3	49.1	49.6	51.6	48.3	50.3	45.1	43.7	38.1	47.2
% Sand	5.9	4.0	44.7	4.5	5.5	5.0	3.8	2.7	10.0	6.1
Index of Texture	50	48	41	51	47	49	44	43	36	46
% Soluble Salts	0.083	0.199	0.222	0.160	0.051	0.161	0.045	0.081	0.032	0.099
% Organic matter	2.12	0.73	0.98	1.84	2.23	1.22	1.86	1.19	1.73	1.13
% Nitrogen	0.180	0.095	0.091	1.151	0.177	0.120	0.141	0.110	0.108	0.097
Carbon/nitrogen ratio	6.85	4.48	6.28	7.08	7.31	5.89	7.64	6.28	9 28	6.73
Rate of Solution	123	41	12	34	57	47	121	31	394	13
Lime requirement ton/acre $CaCO_3$	5.7	1.9	2.1	3.8	4.3	...	2.78	1.37	5.84	4.91

(*a*) Soils of Variety Trial Sites.

Plantation :—	Plantation Diamond.				Plantation Uitvlugt.				Plantation Non Pareil.				Plantation Wales.	
Field No. :—	53.G.D.		89.G.D.		10.Z.		13.E.		14.E.		59.E.		B.V.4.	
Sample :—	D. 252	D. 253	D. 507	D. 508	D. 503	D. 504	D. 674	D. 675	D. 540	D. 541	D. 670	D. 671	D. 771	D. 772
Sampling Depth :—	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.	0—1 ft.	1—2 ft.
Normal pH. ...	4.67	4.75	4.6	4.6	5.5	6.3	4.80	5.12	4.88	6.25	4.83	4.80	4.87	4.68
Exchange pH. ...	3.73	3.77	3.7	3.8	4.0	4.7	3.86	4.24	3.93	5.36	3.96	4.12	4.16	4.18
M.P.S.	48.1	52.3	49.6	49.6	38.7	42.1	47.4	48.1	47.5	52.7	49.1	51.1	53.3	55.2
% Sand	1.5	2.2	3.8	4.0	4.4	4.4	6 3	4.8	8.7	4.2	8.5	3.3	6.9	4.2
Index of Texture ...	48	52	49	49	38	41	46	47	46	52	48	50	52	54
% Soluble Salts ...	0.015	0.016	0.018	0.011	0.029	0.039	0.057	0.101	0.046	0.183	0.038	0.189	0.011	0.014
% Organic Matter	1.87	1.56	3.04	...	1.14	...	1.12	0.98	1.74	0.71	1.53	0.91	3.09	3.01
% Nitrogen ...	0.160	0.125	0.166	...	0.099	...	0.111	0.104	0.133	0.081	0.154	0.113	0.204	0.189
Carbon/Nitrogen Ratio	6.79	7.27	10.7	...	6.70	...	5.85	5.48	7.59	5.06	5.77	4.66	8.77	9.23
Rate of Solution ...	8	0	0	1	9	20	8	36	248	31	...	...	18	5
Lime Reqt. ton/acre $CaCO_3$ ...	14.4	14.3	14.3	...	5.4	...	6.08	3.33	7.1	2.3	8.2	4.8	14.33	14.60

(*b*) Soils of Manurial Trial Sites.

Plantation :—	Pln. Port Mourant		Pln. Rose Hall.		Pln. Enmore.		Pln. Lusignan.		Pln. Uitvlugt.		Pln. Lusignan.		Pln. Versailles.		Pln. Uitvlugt.	
Field No. :—	P.M. Empolder 4.		R.H. 30.		8 B. Adventure.		28 East Good Hope.		14 Zeeburg.		4 E. Empolder.		51 R.D.Z.		94 Met-en-Meerzorg.	
Sample No. :—	B. 104	B. 105	B. 108	B. 109	D. 716	D. 717	D. 708	D. 709	D. 751	D. 752	D. 706	D. 707	D. 753	D. 754	D. 702	D. 703
Normal pH	6.21	6.63	5.77	6.09	5.28	5.22	5.07	4.03	5.62	5.79	5.00	4.85	4.95	4.87	4.88	4.66
Exchange pH	4.82	5.55	4.80	5.08	4.21	4.09	4.30	4.48	4.25	4.36	3.57	3.77	4.03	4.04	3.88	3 41
M.P.S.	49.8	54.7	50.4	51.7	48.4	50.3	50.4	48.7	44 0	45.8	59.3	59.3	51.4	51.2	65.7	59.6
% Sand	1.2	0.9	3.7	2.6	2.7	2.0	4.2	5.0	4.8	2.3	2.8	2.1	5.4	8.5	4.1	2.7
Index of Texture	50	55	50	51	48	50	50	48	43	45	59	59	50	50	65	59
% Soluble Salts	0.045	0.131	0.048	0.143	0.098	0.183	0.120	0.227	0.023	0.048	0.021	0.032	0.015	0.014	0.029	0.056
% Organic matter	2.30	0.98	2.00	1.36	2.16	1.29	2.09	0.98	0.98	0.64	3.80	2.55	4.44	3.37	5.87	5.19
% Nitrogen	0.173	0.092	0.157	0.109	0.155	0.102	0.165	0.085	0.104	0.076	0.263	0.169	0.272	0.240	0.185	0.148
Carbon/nitrogen ratio	7.72	5.89	7.40	7.25	8.10	7.34	7.33	6.66	5.44	4.89	8.39	8.74	9.46	8.14	18.4	20.3
Rate of Solution	107	35	306	−2	170	55	23	42	21	18	−6	−10	−1	−9	−7	24
Lime requirement Ton/acre $CaCO_3$	3.57	1.01	3.36	1.73	5.45	3.69	5.06	2.90	6.96	3.93	14.78	9.83	20.28	19.56	12.72	16.28
Available P_2O_5 p.p.m. (Truog)	nil	50	16	24	52	30	15	10	30	22	15	15	32	22	30	33
Citric P_2O_5 p.p.m.	44	28	44	26	208	56	75	25	66	48	139	71	133	100	208	75
Exch. and water sol. bases mgm. eqs. per 100 gms.																
Lime	8.20	7.00	10.40	12.00	7.70	5.10	7.92	5.28	4.40	4.50	5.56	5.36	1.20	1.50	1.80	1.32
Magnesia	14.20	16.25	12.30	15.95	10.05	12.60	10.72	12.36	7.85	12.65	0.04	9.00	0.30	0.45	0.80	0.64
Potash	0.36	0.27	0.14	0.23	0.47	0.39	0.38	0.49	0.24	0.19	0.42	0.31	0.06	0.07	0.13	0.24
Soda	1.13	1.72	0.15	0.72	1.24	3.71	0.69	0.68	0.45	1.29	0.29	0.60	0.00	0 00	0.05	0.12

APPENDIX III.

Calendar of Agricultural Operations on Manurial Trial Areas.

Experiment No.	Page of Bulletin.	Estate.	Field.	Variety.	System of Replication.	Size of Plots Acres.	Date of Planting.	Date of Applying Limestone and/or slaked lime.	Date of Applying Phosphate.	Date of Applying Potash.	Date of Applying Sulphate of Ammonia.	Date of Reaping.
AIII	81	Enmore	8 B.A.	D. 625	A four by four Latin Square	0.051	2. XII. 32	2. XII. 32[4]			10. I. 33[4]	23. II. 34[4]
AI	80	Port Mourant	4 H.E.	D. 625	A four by four Latin Square	0.051	23. XII. 32	17. XII 32[4]	26. I. 33[8]		26. I. 33[4]	23. II. 34[4]
AVI BI	84 102	Port Mourant	6 A.	D. 625	4 Randomised Blocks of 16 Treatments	0.051	5. XII. 30	27. XI. 30[4]	20. XII. 30[1]		28. I. 31[4] 7. IV. 32[5] 2. IV. 33[6]	1. III. 32[4] 27. II. 33[5] 15. III. 34[6]
AX	97	Lusignan	4 Emp.	D. 625	A five by five Latin Square	0.051	18. XII. 32	9. I. 33[4]			9. II. 33[4]	27. II. 34[4]
AIV	81	Lusignan	28 E.G. H.	D. 625	A four by four Latin Square	0.051	25. XII. 32	9. I. 33[4]	9. II. 33[8]		9. II. 33[4]	6. III. 34[4]
AII	80	Rose Hall	30 R.H.	D. 625	A four by four Latin Square	0.048	27. I. 33	2. II. 33[4]	13. IV. 33[8]	13. IV. 33[8]	2 III. 33[4]	7. III. 34[4]
AV	82	Uitvlugt	14 Z.	D. 625	A four by four Latin Square	0.041	25. II. 33	1. III. 33[4]	13. IV. 33[8]	13. IV. 33[8]	13. IV. 33[4]	9. III. 34[4]
AXI	98	Versailles	31 R.D. Z.	D. 625 Mixed	A five by five Latin Square	0.051	14. II. 33	7. III. 33[4]		12. V. 33[8]	12. V. 33[4]	15. III. 34[4]

1 Superphosphate, 4 Plants, 5 First Ratoons, 6 Second Ratoon, 8 Basal Application.

Calendar of Agricultural Operations on Manurial Trial Areas.

Experiment No.	Page of Bulletin.	Estate.	Field.	Variety.	System of Replication.	Size of Plots Acres.	Date of Planting.	Applying Limestone and/or slaked lime.	Applying Phosphate.	Applying Potash.	Applying Sulphate of Ammonia.	Reaping.
BII	103	Leonora	21 G.V.	D.625	12 Randomised Blocks of 7 Treatments	0.043	5. VI. 31	2. IV. 31[4]				21. V. 32[4] 5.V. 33[5] 20.IV.34[6]
AXIII BV DII	100 108 116	Farm	86 G.D.	D.625 & D.118	6 Randomised Blocks of 20 Treatments	0.051	7. II. 31	20. I. 31[4]		12.III.31[4] 4. V. 32[5] 14.VI. 33[6]	12.III.31[4] 4. V. 32[5] 14.VI. 33[6]	14 IV. 32[4] 5. V. 33[5] 10. V. 34[6]
AVIII	92	Sophia Expt. Station	2 E.	D.602/22	9 Randomised Blocks of 5 Treatments	0.051	11. II. 32		22. VII. 33[5,8]		11.II.32[2,7] } [4] 24.III.32[3] } 9. V. 33[2] } [5] 13.VI.33[3] }	21.IV. 33[4] 22.III.34[5]
AIX	94	Sophia Expt. Station	2 E.	Diamond 10	7 Randomised Blocks of 5 Treatments	0.051	15. III. 32		22. VII. 33[5,8]		6. IV. 32[4] 9. V. 33[5]	22.IV. 33[4] 21.III.34[5]
AXII	98	Uitvlugt	94 M.Z.	D. 625 & D. 118 Mixed	A five by five Latin Square	0.051	5. XI. 32	10. XI. 32		20. XII. 32	20.XII. 32	28. XI.33[4]
BIII CI	105 112	Sophia Expt. Station	12 W.	Dimond 10	A six by six Latin Square	0.0413	19. X. 32				19.XII. 32	5.XII. 33[4]
BVI	111	Uitvlugt	75 Z.	D. 625 & D. 118 Mixed	12 Randomised Blocks of 7 Treatments	0.051	30.IV. 31	30.IV. 31[4]				10.IX. 32[4] 7. IX. 33[5]
AVII BIV CII DI.	87 106 113 115	Sophia Expt. Station	5, 7, & 8 W.	D. 625	4 Randomised Blocks of 32 Treatments	0.050	— V. 30	9. IV. 30[4]	1 or 9, 4 30. VI. 30	14. VII. 30[4]	14. VII. 30[4] 24. X. 31[5] 14.XI. 32[6]	3. X. 31[4] 6. X. 32[5] 14.XI. 33[6]

1 Superphosphate. 2 Sulphate of Ammonia. 3 Second dose of Sulphate of Ammonia. 4 Plants. 5 First Ratoon,
6 2nd Ratoons. 7 Bacterised Peat. 8 Basal Application. 9 Rock Phosphate.

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